

Clemson University



3 1604 013 657 749

SOUTH CAROLINA EXPERIMENT STATION
LIBRARY
CLEMSON COLLEGE SOUTH CAROLINA

I 27.5:



Digitized by the Internet Archive
in 2013

<http://archive.org/details/newreclamationer16unit>

NEW RECLAMATION ERA

VOL. 16

JANUARY, 1925

NO. 1

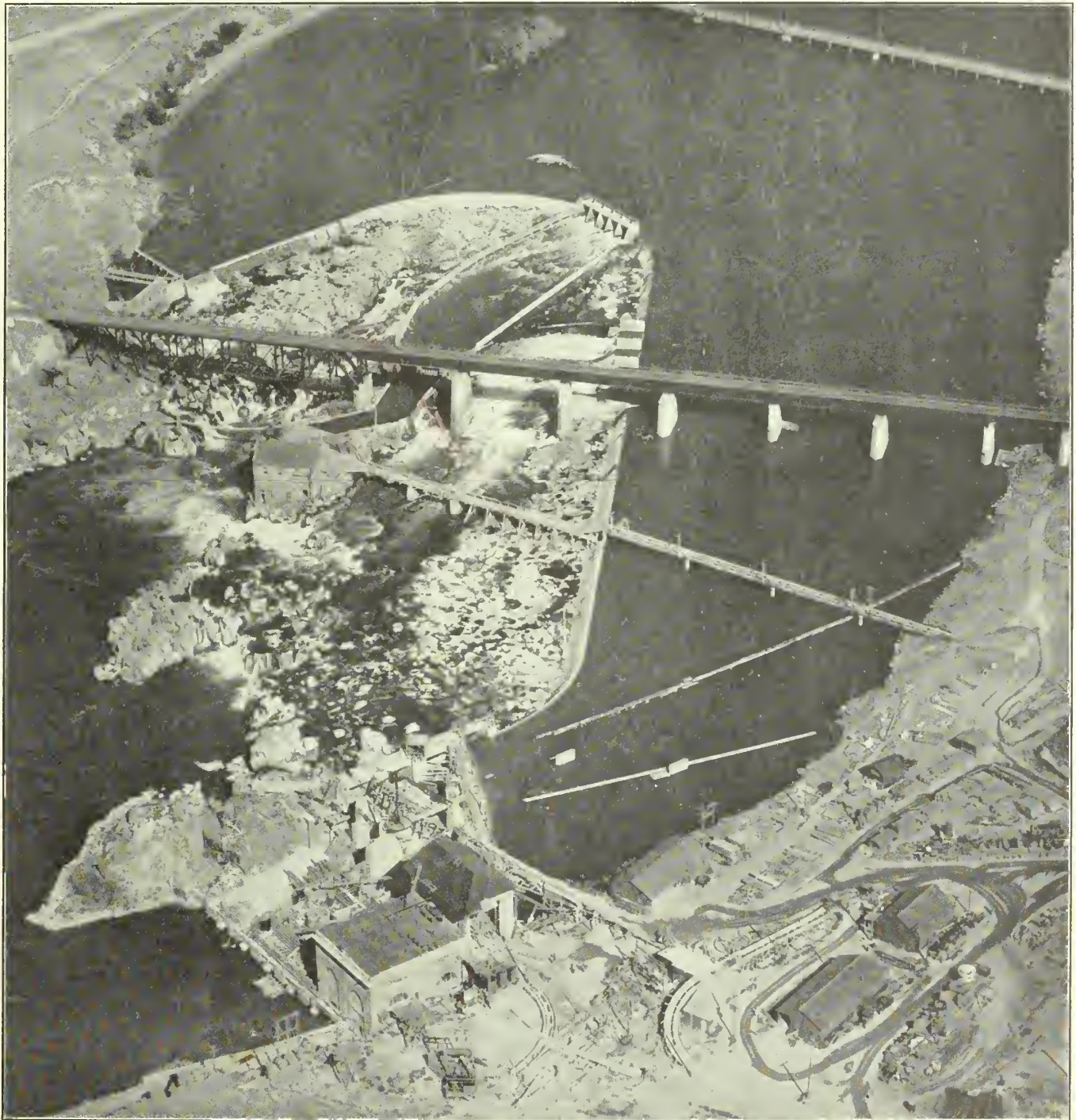


Photo by Army Air Service

AMERICAN FALLS DAMSITE

AN AEROPLANE VIEW OF THE SITE WHERE THE GREAT AMERICAN FALLS DAM WILL BE CONSTRUCTED
BIDS FOR THE CONSTRUCTION OF WHICH WILL BE OPENED IN JANUARY

RECLAMATION, stressed in the President's message you have heard read, is one of the greatest problems for the future of the West, and therefore for the future of the country. The placing of men upon land which they themselves own and they themselves till is the surest foundation for a democracy, and I am a great believer in the program of reclamation for the West. But my contact with it during the past three years and more—during which time I have visited nearly all of the great reclamation projects and during which time I have had charge here of the appropriations for carrying on the work—has impressed me with this fact: That the welfare of the West and the welfare of the country as bound up in the policy of reclamation demands that it is absolutely necessary that this whole program be now put upon a business basis. It must be taken out of politics. Projects must be selected not through political logrolling but upon the basis of merit and with reference to the opportunity there is for each project to succeed and make good.

*—Extracts from speech by Hon. Louis C. Cramton before
the House of Representatives on December 3, 1924.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

JANUARY, 1925

No. 1

SECRETARY WORK OUTLINES FUTURE RECLAMATION POLICY

In letter to the President, the Secretary of the Interior calls attention to needed changes in the reclamation law and outlines methods and measures tentatively adopted by the department

THE SECRETARY OF THE INTERIOR
WASHINGTON

December 11, 1924.

THE PRESIDENT,
The White House.

MY DEAR MR. PRESIDENT:

The time has arrived for the adoption of a broad program of reclamation development. Reclamation legislation recently enacted by Congress will improve the condition of settlers and make it possible for them to meet their payments to the Government in the future. It omits, however, certain required features to supply which additional legislation is needed, which will:

(a) Define the policy and procedure with respect to cooperation between the Federal Government and the States in the development of new projects;

(b) Provide for amortized payments with a low rate of interest, on advances made by the Government for the development of farms;

(c) Bring about the adoption of a unified plan for the colonization and closer settlement of land in excess of homestead units, held in private ownership.

I suggest that Congress be invited to appoint a joint congressional committee to consider these questions, with a view to drawing up a reclamation code which will constitute a policy and working plan for existing projects and future development. To this end I have outlined herein certain methods and measures which this department has tentatively adopted.

EXISTING PROJECTS

1. The obligations of settlers on existing projects should be adjusted and a basis provided for future payments. This will require a reappraisal of areas to determine their ability to produce profitable crops under irrigation.

2. The Government has expended a large amount of money in the construction of reservoirs which are only partly used, with a consequent heavy loss of

income. There are other projects where storage is needed to utilize the distributing works. A definite construction program for the completion of works needed to secure the full benefit of the Government's investment and complete utilization of the resources on these projects should be adopted.

3. The management and control of existing works should be transferred to the water users, where they are in a position to organize and to be entrusted with this authority, the form of such organization to be that of an irrigation district operating under State laws.

FUTURE DEVELOPMENT

4. All investigations of future projects should include a comprehensive study of legal, engineering, economic, agricultural, and financial conditions. Legal studies are needed to determine the title to water rights; engineering studies to determine the cost of irrigation works; economic studies to determine the value of land held in private ownership, the outlay required to change raw land into farms, and the character of markets; agricultural studies to determine the crops suited to the locality and the productive value of water under irrigation; financial studies to determine sources of credit, interest rates, and cost of settlement and farm development. The results of these investigations should be submitted to Congress and to the authorities of the State in which the development is located.

5. On all projects undertaken hereafter the State in which the development is located should participate in the selection of settlers and the development of farms. The States should not be required to contribute to construction costs, but should be required to contribute to the fund provided for advances to settlers for farm development, as they now contribute to the construction of roads and to agricultural education.

6. A fund should be provided from which money can be advanced to help

worthy, needy settlers improve and equip their farms. Such advances should bear interest and, for permanent improvements, should extend over long periods. Four per cent is suggested as the interest rate.

7. There are almost as many farm laborers as farm owners in this country. The conditions under which the families of farm laborers live are, therefore, a matter of great importance. Provision should be made on these projects to give the farm laborer an opportunity to acquire a home and a garden, the number to be limited to the local demand for hired labor. In this way we will train up the farm owners of the future.

8. Provision for advice and direction to settlers in the development of their farms and in working out plans of marketing and cultivation, should be a feature of all new development.

GENERAL

9. The plans for future reclamation development must take into consideration the needs of the different States, the water-right problems of interstate streams, the amount of the reclamation fund which will be available during the next 20 years. The construction of reservoirs by the Bureau of Reclamation under a forward looking plan of this character will be an effective agency for lessening controversy and securing an equitable distribution of the water supply.

10. Efforts to reach an agreement for the economic apportionment of water of interstate streams, now being made by the States, have the cordial approval and support of this department. It is infinitely better than the costly and unsettling litigation certain to arise unless such agreements are reached. It ought to be possible under such agreements to work out plans for the storage and regulation of the water of the Missouri, Colorado, Platte, Rio Grande, and Columbia Rivers and their tributaries.

(Continued on page 2)

NEED FOR GENERAL REVISION OF THE RECLAMATION ACT

Commissioner Elwood Mead points out that revision of the reclamation act is a prerequisite to the success of future reclamation, and outlines the fundamental changes necessary

I BELIEVE that the future success of reclamation will be promoted by a complete revision of the reclamation act. Many things indispensable to the adjustment of project costs and to the prompt and successful colonization of the land are not included in the act recently passed by Congress. Among the matters which should have consideration are the following:

(a) The Bureau of Reclamation should have its duties and responsibilities more clearly defined. At present the bureau is a creation of the Secretary to enable him to carry out the duties imposed by Congress. The extent of the commissioner's authority and the policies which control the bureau change with the views of different secretaries. Such an arrangement is not favorable to continuity of action or the carrying out of a long-time program of development. Giving the bureau definite authority and responsibility would relieve the Secretary of a burden that is destined to become far more arduous in the future.

(b) The time has come for considering requiring interest payments on the construction costs of all new projects. If this were done, it would put reclamation on a business basis. It would end the favoritism that is now shown the owners of private land in the development of

their properties with interest-free money. It would tend to stop the inflation of prices of unimproved land which has been a continuing abuse in the past and has often prevented realizing the desirable social and economic purposes of the act. If interest is paid, it does not greatly matter when payment begins on the money spent on the works. They could remain the property of the Government until irrigators were ready to assume control and if the interest rate were made low, say 3 or 4 per cent, no additional burden would be imposed on the settler of small means. On the contrary, it might improve his condition, as he now sometimes pays twice for his water right, once to the Government, and again in high land prices and high interest rates on borrowed money.

(c) The increased cost of works and the large amount of money which has to be spent in changing unimproved land into habitable farms make the methods of colonization and farm development matters of first importance. Provision should be made for soil surveys, appraisal of prices of farms according to productive value, whether the land is the property of the Government or excess holdings of private owners. The qualifications of settlers should be scrutinized. There must be publicity to call attention

to the opportunities of these projects and a farm development program to aid the beginner in his development. These things are necessary to bring under cultivation abandoned farms on old projects, check the unhealthy increase in tenancy, and insure the prompt settlement, development, and payment of charges on all new projects.

(d) This law ought to be an opportunity for home ownership for the settler of small means. If it is to be this, a fund must be provided from which advances can be made to help in the improvement and equipment of farms of selected settlers who lack all the capital required. We now appropriate immense sums of money to be repaid without interest, for the construction of works which improve the landed possessions of private owners, but we do nothing to help the farmer of small means become the owner of that land. Our terms of payment for works are the most generous of any country. Our aid to the settler and for farm development is the least. The time has come for a reversal of the objects of the Government's liberality.

(e) It is believed that the law should require State approval and State cooperation in the case of all new projects. This is now required in the building of highways and in agricultural extension. Doing this will bring to this complex task a knowledge of local conditions possessed by the State, will arouse the effort and interest of the people most concerned in the success of these new communities, and will lessen the burden on the Federal fund. Now the law not only does not require State effort but gives no opportunity for the exercise.

SECRETARY WORK OUTLINES POLICY

(Continued from page 1)

Such action on the Colorado is urgently needed to protect the Yuma reclamation project from danger by floods, and the Imperial Valley irrigation district in California from being devastated both by floods and drought.

11. The primary purpose of all reclamation construction is to extend irrigation. In all stages there will be incidental benefits to come from the development of power. Whatever arrangements are made for such power development, or its distribution, there should be such control by the Government as to prevent interference with the use of the stored water in irrigation.

RECLAMATION OF SWAMP, CUT-OVER, AND NEGLECTED LAND

12. The reclamation act recently passed by Congress authorizes an appropriation

of \$100,000, to be used in part for reclamation investigations in sections of the country outside of the arid region. It is believed that there is a field for the closer settlement and creation of prosperous homes on areas of neglected swamp or cut-over land. The methods of colonization and the economic conditions under which these new communities will be established are of special importance. All such investigations should be cooperative, the State to contribute one-half of the cost. It is believed that States like North Carolina and South Carolina, which have commissions dealing with settlement, will welcome such cooperation and that such action will promote rural progress in sections where it will be of national advantage.

Very truly yours,

HUBERT WORK.

COL. BENJAMIN F. FLY HANDS OUT MESA FRUIT

Accompanied by Hon. Henry F. Ashurst, United States Senator from Arizona, Col. Benjamin F. Fly, of Yuma, a frequent and welcome visitor at the Washington office of the Bureau of Reclamation, added fame recently to his "beloved Yuma Mesa" by presenting President Coolidge with an 80-pound box of grapefruit and oranges, and similar boxes of concentrated Arizona sunshine and sweetness to Secretary Work, Secretary Hoover, and Commissioner Mead.

ECONOMIC PHASES OF OWYHEE PROJECT, OREGON-IDAHO

Committee of agricultural and economic experts concludes that project is feasible if development is carried on under provisions of revised reclamation act

INTRODUCTION

THE investigations were made at the request of the Division of Farm Economics of the Bureau of Reclamation. The committee was instructed to investigate the economic and agricultural phases of the Owyhee project and report to the Bureau of Reclamation its conclusions and recommendations.

A committee was selected consisting of Mr. A. T. Strahorn, soil surveyor, Bureau of Soils, Washington, D. C.; Prof. M. R. Lewis, agricultural engineer, University of Idaho, Moscow, Idaho; Prof. G. R. McDole, soil technologist, University of Idaho, Moscow, Idaho; and Prof. W. L. Powers, soil technologist, Oregon Agriculture College, Corvallis, Oreg. The committee was assisted in assembling these data, and by conference, by Messrs. J. B. Bond, superintendent, Boise project, Idaho; W. H. Blackmer, assistant engineer, Bureau of Reclamation; E. O. Larson, assistant engineer, Bureau of Reclamation; G. H. Hogue, assistant engineer, Bureau of Reclamation; F. O. Youngs, scientist in soil survey, Bureau of Soils, Washington, D. C.; Dr. R. E. Stephenson, division of soil technology, Oregon Agriculture College; H. L. Holgate, chief field counsel, Bureau of Reclamation; and J. C. Marr, senior drainage engineer, Bureau of Public Roads.

A committee of local citizens residing within the boundaries of the Owyhee project, consisting of Mr. Ivan E. Oakes, chairman, engineer, Ontario; Mr. H. B. Cockrum, banker, Ontario, and Mr. Dick Tensen, farmer, Nyssa, Oreg., were appointed to review this report and submit its findings to the Bureau of Reclamation.

Mr. Youngs and party began the soil survey of the Gem District on July 28, and Professor Powers and Doctor Stephenson began the soil survey of the Dead Ox Division at the same time. Mr. A. T. Strahorn took charge of the soil survey work on July 30, 1924.

Prof. M. R. Lewis carried out the investigations of the economic conditions of the various pump districts, and Professor McDole, Mr. Blackmer, and G. C. Kreutzer collected data on the agricultural and economic phases of the district. Messrs. E. O. Larson and G. H. Hogue carried out the field work on drainage investigations, and were assisted in conference by Mr. J. C. Marr. Mr. H. L. Holgate, chief field counsel of the Bureau of Reclamation, conferred with the direc-

tors of the irrigation district and with other groups of citizens not yet organized into districts, and spent some time conferring with the committee on the legal phases of the project.

During the time that field work was in progress, the local citizens of the communities assisted in every way possible. Messrs. E. C. Van Patton, Pat Gallagher, W. H. Doolittle, County Agent L. R. Briethaupt, all of Ontario, and Mr. J. H. Lowell of Caldwell, Idaho, gave liberally of their time to further investigations. In some instances they furnished cars to carry investigators to various parts of the project.

The scope of the work consisted in making the soil survey and land classification, economic analysis of the pump districts, the study of drainage conditions, collection of data on yields and prices of the principal crops now grown in the section, as well as making balance sheets, inventories, and gathering such other data as was found necessary to determine the feasibility of the project from the economic viewpoint.

The committee was instructed to make such field investigations, and to collect such data, in order that it could finally summarize its findings, having in mind the provisions of the bill H. R. 9559, already passed by the House of Representatives and now pending in the Senate.¹

CONCLUSIONS

1. The land classification data show an area of 58,859 acres of first-class land that is well adapted to produce satisfactory yields of all crops that may be successfully grown in the region under consideration. There are 56,140 acres of second-class land that can not be expected to produce as high an average yield as the lands of the first class. It has been assumed that the second-class lands will have an aver-

age productivity of about 75 per cent of that produced by the lands of the first class. Some of the lands in the second class may, after a period of years, attain an increased productivity either through the operation of effective drainage measures or by the use of special crops that experience may show to be unusually well adapted to the soils. Under such conditions, the acreage of lands that would reach full productivity would be slightly increased over that now given for first-class lands.

2. The nonirrigable area of the project is 43,568 acres. There is a remote possibility that a small part of this area may eventually be brought into a productive condition, but to determine such possibilities would require a very complete and extended investigation extended over a long period of time. Studies of that character can not be carried out at present, and the difficulties attending the reclamation of these soils are so great that the land is considered as entirely nonirrigable.

3. There are about 4,000 acres of new land under the Owyhee Canal that were not covered by the present investigation. Assuming that the conditions on these tracts are similar to those in the nearby districts, and that the tracts were supplied with water from the proposed canal, the total irrigable area of the project would be increased to about 117,951 acres.

A summary of the irrigable and nonirrigable acreage in each of the divisions of the project is given in the accompanying table.

5. The soil survey gives 115,000 acres of irrigable land, and there are 8,460 acres under the "shoestring," and other small pumps near Ontario, and 4,100 acres scattered land under the Owyhee ditch without water right, and 12,000 acres under the Owyhee ditches receiving a partial water supply. Hence, the total area to be supplied is 139,560 acres.

(Continued on page 4)

¹ Act approved Dec. 5, 1924.

Owyhee project land classification summary

Division	Irrigable land (acres)					Nonirrigable land (acres)				
	Area project	First class	Second class			Total	Topography	Soil		Total
			Topography	Soil	Drainage			Soil	Drainage	
Dead Ox Flat.....	39,306	23,832	6,421	-----	80	30,333	6,243	2,099	631	8,973
Mitchell Butte.....	41,126	11,197	16,850	-----	80	28,127	11,625	-----	1,374	12,999
Kingman.....	11,688	4,622	2,550	-----	790	7,962	2,859	452	415	3,726
Succor Creek.....	66,447	19,208	6,051	16,106	7,212	48,577	8,980	3,531	5,356	17,870
Total.....	158,567	58,859	31,872	16,106	8,162	114,999	29,707	6,085	7,776	43,568

LOCAL COMMITTEE GIVES STRONG INDORSEMENT

Believes that, if constructed in conformity with recommendations of Fact Finding Committee, the project will be an outstanding success and a creditable monument to reclamation

(Continued from page 3)

(These figures may change somewhat when soil data are finally compiled.)

6. Eighty thousand nine hundred and sixty acres of new land and 46,600 of old land in pump districts will receive a full water right; 12,000 acres under Owyhee ditch will receive a partial water right.

7. The total estimated cost of the project is \$17,404,000, divided as follows \$139 an acre for new land not now supplied, \$126.50 an acre for lands in pump districts, and \$25 for lands under the Owyhee ditch.

8. The duty of water is determined to be 4.6 acre feet diverted and 3.22 acre feet delivered.

9. Drainage work will be needed to the extent of approximately \$993,000. The most serious situation is in the Gem unit where 26,000 acres are involved. The \$993,000 is included in engineer's estimate.

10. Future drainage investigations are necessary.

11. Forty-six thousand six hundred acres now receive water from pumps at an annual charge of from \$3.38 an acre to \$11 an acre.

12. The Gem District, because of seeped area, is in need of immediate relief.

13. The cost of leveling land and clearing is from a few dollars an acre to \$60 an acre.

14. The climate is mild—maximum 113°, minimum -26°, mean average 51°; length of growing season 144 days; rainfall 11 inches.

15. Alfalfa, red clover, pastures, corn, and other small grains do well. Apples and prunes are the chief fruit crops. Head lettuce and celery are grown considerably.

16. Average yields on first-class land are: Wheat, 40 bushels; barley, 55 bushels; corn, 50 bushels; clover seed, 5 bushels; alfalfa, 4 to 5 tons; and potatoes, 250 bushels. On second-class land it is estimated to be 75 per cent of the above.

17. Several marketing organizations operate throughout the section, chiefly packing and selling fruits and vegetables. A large cooperative creamery is at Payette. Freight rates are high to distant markets, which makes it advisable to produce concentrated products.

18. Farm units should be a maximum of 80 acres and be of all sizes to 20 acres. Size and shape should depend on soil, topography, and the settler. Generally from 40 to 50 acres will be sufficient.

19. Generally 40 acres, in which one-half to two-thirds are planted to clover,

alfalfa, and pasture, and the balance to corn, potatoes, and wheat, in varying proportions, will prove most satisfactory. Livestock should be kept to consume the feed grown.

20. A good farm unit under such a plan should produce, when fully developed and stocked, as much as \$60 an acre. The average will be about \$45 an acre, and on second-class land \$35 an acre.

21. The land ownership is as follows: State land, 5,000 acres; Eastern Oregon Land Co., 10,000 acres; other private lands in small areas, 47,960 acres; public lands not patented, 18,000 acres; under Owyhee ditch, 12,000 acres; and in pump districts (average size of holding 59 acres), 46,600 acres.

22. Land values were difficult to ascertain. Brush land is held at \$5 to \$40 per acre. Improved land under irrigation is valued at \$100 to \$150 an acre.

23. Taxes are reasonable, being 31½ mills average on a value of \$70 for improved land, or \$2.20 an acre.

24. About 75 per cent of the farms are mortgaged, but generally not more than \$50 an acre. Most of the mortgages are held by the Federal Land Bank of Spokane. Banks charge 10 per cent on short-time loans. There seems to be no shortage of such credit.

25. A 40-acre farm fully developed and equipped will cost about \$7,500 from sagebrush to full production.

26. A good settler with \$5,000 and a loan of \$2,000 from the land bank will have a very solvent undertaking.

27. A settler with \$2,500 will generally have great difficulty without assistance other than is now provided.

28. A settler with \$2,500, taking a farm all cleared and one-half planted to alfalfa and pasture, can, with the aid of the land bank, succeed.

29. It is recommended that the Government sell its land at \$5 an acre, on terms, prepare and seed one-half the farm at a cost of about \$1,000, to be repaid by a deposit of 40 per cent on purchase and balance in 20 years at 4½ or 5 per cent. Under this plan many would succeed who would otherwise fail.

30. Settlers should be selected in accordance with their experience, capital, and other desirable characteristics.

31. The new land will require from 1,400 to 1,600 settlers to fully utilize it. Unless a definite plan of settlement is made, it will take many years to obtain them.

32. The pump districts are organized as districts or corporations. Due to indebtedness, it will probably require three irrigation district organizations to contract for the payment of the project.

33. If settlement proceeds rapidly, the project will probably yield about \$45 an acre on first-class land and \$35 an acre on second-class land. Hence it would take about 70 years to pay out after payments began, or 75 years from first public notice.

34. The committee concludes that, on the basis of the above conclusions and the passage of the proposed reclamation bill, the project is feasible.

W. L. POWERS,
Soil Technologist.
A. T. STRAHORN,
Soil Surveyor.
M. R. LEWIS,
Agricultural Engineer.
G. R. McDOLLE,
Soil Technologist.

LOCAL INDORSEMENT

ONTARIO, OREG.,
September 30, 1924.

MR. GEO. C. KREUTZER,
Director of Farm Economics,
Bureau of Reclamation,
Wilde Building, Denver, Colo.

DEAR MR. KREUTZER:

Answering your letter of September 19, we, the local committee, appointed to review the report of the experts on the Owyhee project, submit the following as a brief report on the questions outlined in your letter. This report will be followed by a larger and more comprehensive report at a later date.

1. In the brief time allotted to us it has been practically impossible to obtain authentic prices on raw lands in the Owyhee district. There are a great number of tracts of patented land as well as a number of tracts which have been recently entered upon. From those who own lands under the Owyhee project we have estimated that present prices range from \$15 to \$40 per acre, depending upon the location, topography, and quality of the various tracts. The real value of raw land for colonization purposes is a question upon which a great many people differ. There is, on one hand, the enthusiast who believes that this is the best land that lies out of doors and that it has practically no limit on value. On the other hand, there are those who believe that raw land has little or no value and that the water makes it valuable.

There are two road land companies which own rather large tracts of land within the boundaries of the district. One company owns about 10,000 acres and the other between 2,000 and 3,000 acres. Local agents for these companies are not advised at present as to the prices their companies have on this land. The companies have a tentative plan outlined for the colonization of their land lying within the boundaries of the Owyhee project. As we understand it, the plan contemplates a very small down payment, probably not to exceed 10 per cent, with the remainder of the purchase price spread over a period of 30 or 35 years, the remainder of the purchase price to be amortized on a plan somewhat similar to the plan under which the Federal land bank loans are made. As we understand it, the tentative plan of the road land companies contemplates an interest charge of about 5 per cent on the deferred payments with an amortization payment of 1 or 2 per cent per annum. Under this plan the raw lands would make an attractive investment at a much higher price than if the settler was compelled to pay cash for the raw land. Private individuals, however, will probably not be able to extend such favorable terms to the settlers and will perhaps have to take a less price per acre for their land.

It seems to this committee that the cost of preparing the land, its location, and its fertility should have some bearing on its value, and that (as in the case of the farm unit) there should be a sliding scale of valuation adopted and an appraisal of each tract made. This valuation would probably range from \$2.50 to \$25 per acre. All of those whom we interviewed seemed quite willing to accept a valuation on the raw land which may be set by a board of appraisers properly selected to go over the lands of the project and make a careful appraisal of the same.

This committee feels that in order to prevent speculation the report of the Fact Finding Commission should be adopted and enacted into law.

2. The best type of agriculture for this section, in the opinion of this committee, is the production of hay, forage, and grain crops, which would be fed principally to dairy cattle, beef, sheep, hogs, and poultry. There is a large area of this county tributary to the Owyhee project which will never be anything but grazing land. Normally, Malheur County supports around 300,000 head of sheep and a large number of cattle and horses. There will always be a certain amount of hay and grain crops which will be cash crops, salable to the range herds which winter in

the valley along the Snake River. The rest of the forage and grain crops must be fed to livestock on the farms. We feel that a certain portion of each farm unit should be planted to alfalfa or clover and a certain portion to pasture and grain, so as to provide feed for the range herds and feed for the finished livestock and dairy herds that would be kept on the farms. The remainder of each unit should be planted to crops which we may speak of as cash crops or speculative crops, such as fruit, lettuce, clover seed, onions, alfalfa seed, celery, beans, broom corn, tomatoes, and potatoes. The older settled land under the Owyhee project has adjusted itself to this type of agriculture in about the following proportions: Three acres of hay and forage crops to one acre of the cash or speculative crops. We feel that this is about the proportion proper for this section as it has worked out satisfactorily under the present ditches.

In fixing the size of the farm units consideration should be given to the fertility of the soil, topography of the land, its location, as well as the particular characteristics of the individual settler. While in some localities or individualities one man would successfully take care of 100 acres, another man, under different conditions, could not successfully handle to exceed 20 acres. We do not feel that the farm unit should be fixed arbitrarily but should be based upon a sliding scale and should range from 20 acres up to 100 acres.

3. It is a well-known fact that all of the cheap reclamation projects have been built. Consequently we must have some changes in the reclamation laws in order to successfully and quickly colonize new projects. The recommendation of the Fact Finding Commission that repayments to the Government on construction charges be made at the rate of 5 per cent on the gross production per annum is a change in the reclamation law that we feel should be made. In addition to this we feel that a fund should be established whereby each settler could be loaned a sufficient sum of money on rather long-time terms to assist him in the development of his land. We would suggest that such loans provide funds for assisting in leveling, ditching, fencing, first seeding, pure water, and all buildings that are attached to the land. We believe that short-time loans should be handled by a local organization. The short-time loans would include funds for the buying of livestock, such as hogs, dairy cattle, sheep, and equipment. We do not wish to be understood, however, to recommend that all this be given to the settler. We feel that he should have a certain part of

his necessary capital so as to insure his interest in the success of his venture. Under ordinary circumstances we feel that the settler should have of his own funds at least 50 per cent of the amount he will require on short-time loans and 25 per cent of the amount he might require on the long-time loans. He should not be required to have as large a proportion of the amount needed for permanent improvements as he should be required to have of the amount needed for livestock and equipment, for the reason that the amount invested in permanent improvements would be a capital investment and would be gradually increased.

Any such loans which might be made to the settlers by the Government should have careful supervision by the project manager or some one who would keep in close personal contact with each settler. The safety of the Government's investment in the project should always be one of the first considerations and the settlers should not be allowed to get the idea that the Government owed them something or was making them a gift.

If no plan is provided under the new reclamation law whereby the settlers can obtain loans to assist in the development of their lands, the average settler on the Owyhee project should have from \$3,500 to \$4,000 in cash, livestock, or equipment.

We feel that settlers on the project should be carefully picked and selected with due regard to their experience, aptitude, and other characteristics which would tend to make them successful and desirable residents of the community.

We do not favor a wholesale plan of preparing and seeding a portion of each farm unit to alfalfa or clover for the following reasons:

First. After it is definitely decided by the Department of the Interior that the Owyhee project is to be built it will be several years before water will be available upon the new land. In the meantime people who have patented land or land upon which they have filed, or those who wish to buy land, can employ their time by getting their land prepared and ready for the water when it comes.

Second. Each man should have the option of either having the Government prepare a portion of the land for him or of doing it himself so that he may reap the benefit of his own labor, if he desires to do the work himself. We do, however, favor the creation of a small revolving fund which would be available to prepare a certain amount of land under the project so that if there is a prospective settler who wishes a portion of his land already seeded to alfalfa or clover, or who has his livestock and equipment at the time of

(Continued on page 6)

OWYHEE PROJECT REPORT

(Continued from page 5)

purchase, he could then buy the prepared land and immediately have productive crops. Such a revolving fund could also be used to prepare and seed lands which we might term experimental farms to see what might be done with that particular type of soil or location.

In arriving at the average gross returns per acre under the project we have consulted with the county agriculturist and secured records from him as to the yields, prices, and percentages of the various crops. The accompanying table has been worked out from the statistics furnished the committee by Mr. L. R. Breithaupt, our county agriculturist.

This table is prepared from records extending over a period of 5 years and which include nearly 300 individual records. In many cases the same farm has reported over the full five years. These records disclose that oats is not a paying crop and consequently we have dropped it from our table. Prices are based on the 10-year period from 1909 to 1918, inclusive, and we might state that for practically all of the crops included in the table present prices are much better than those used in the table.

Assuming that the settlers repay the construction charge at the rate of 5 per cent of their gross annual return and that

the cost of the project will be \$139 per acre, it will take 55 years from the time payments start and 60 years from the first notice to return to the Government the full cost of the Owyhee project.

We feel that the Owyhee project is entirely feasible and thoroughly practicable. It is our opinion that the lands embraced within the project constitute one of the largest bodies of high-class land in the West that is susceptible of irrigation. Every condition for the success of the project is present. The Owyhee project has good soil, abundant water, an excellent climate, high-class citizenship, and a large portion of the land already settled and successfully farmed under a partial water right. There are 15 common schools, 4 high schools, and 7 progressive little cities and towns now on the land which will be embraced within the project. Three main State highways and one State market road bisect and cross the lands under the project. No part of the proposed project is more than 5 miles from a gravelled highway at the present time. A hydro-electric power line now runs through the length and breadth of the lands embraced in the project. Cooperative marketing agencies and a county agriculturist and a county club leader now serve those living within the boundaries of the district.

A main line transcontinental railroad runs through the length of the project and two branch lines of the railroad serve other portions of it. No part of the project is more than 8 miles from a railroad station or a loading point. We now have excellent prospects of securing a direct rail connection with San Francisco and Los Angeles, Calif., markets. Due to the rapid growth of those centers, they furnish an excellent market for many of the products raised in this section for the reason that the products grown here are not successfully raised in California.

We feel that if the recommendations of the Fact Finding Commission are enacted into law and the Owyhee project constructed, it will be an outstanding success and a creditable monument to the Reclamation Service and to the foresight and wisdom of those who prepared the fact finding report.

Respectfully submitted,

IVAN E. OAKES, *Chairman.*

DICK TENSEN,

HARRY B. COCKRUM,

Local committee, Owyhee project.



Pure-bred dairy herds should be a feature of the Owyhee development

1	2	3	4	5	6
Crop	Reasonable average yield per acre	Reasonable average price expectation based on 1909-1918 statistics	Probable gross return per acre	Approximate present crop production in percentage of total farm area	Composite factor of columns 4 and 5
Alfalfa.....	5 tons.....	\$8.00	\$40.00	41	\$1,640
Wheat.....	40 bushels.....	1.00	40.00	12	480
Corn.....	60 bushels.....	.875	52.50	7	368
Ensilage.....	10 tons.....	5.50	55.00	3	165
Clover.....	1.5 tons hay.....	7.50	61.25	5	306
Potatoes.....	15 bushels seed.....	10.00			
Barley.....	125 hundredweight.....	1.00	125.00	5	625
Fruit.....	55 bushels.....	.70	38.50	4	154
Pasture.....	¾ carload.....		250.00	4	1,000
Vegetables.....	2-3 cattle, 8-10 sheep.....		28.00	2	56
Miscellaneous.....	½ carload.....		150.00	1	150
Buildings.....			40.00	1	40
				15	
Total, \$4,984			Gross, \$49.84		

The health and comfort of stock, their individual likes and temperaments, and many other things seemingly small count for a great deal in successful feeding.

COTTON GROWING ON THE SOUTHWESTERN PROJECTS

The article reflects the methods generally used on the Salt River, Yuma, Carlsbad, and Rio Grande irrigation projects, where the various operations to produce a crop are more or less the same

FOUR of the irrigation projects of the Bureau of Reclamation had large acreages of cotton in 1924. The yields reported and the prices obtained indicate that this is one of the major crops of the southwestern country, when grown under irrigation, and offers satisfactory returns to farmers who understand the methods of successfully growing it. The Salt River and Yuma projects in Arizona, the Carlsbad project in New Mexico, and the Rio Grande project in New Mexico and Texas have revealed some interesting figures. In 1917 only 40,000 acres of cotton were grown on these projects, whereas in 1923 the area had increased to 135,627 acres which produced a crop with a gross value of \$16,745,231, or an average of \$123.46 an acre. This sum was more than one-quarter of the total of the 1923 gross crop value of these projects. The crops returns for 1924 were not yet completed at the time this article was written.

During the war long-staple cotton was much in demand and high prices were obtained until 1920 when the growers experienced great difficulties in disposing of their crop. Since that time they have turned their attention to growing medium-staple varieties although some long-staple cotton is still grown.

The two principal medium staple varieties grown are Acala and Durango, although Hartsville, Lone Star, and Mebane are grown to some extent. The tendency during the past two years has been to produce staples of $1\frac{1}{16}$ inches to $1\frac{1}{8}$ inches in length, notwithstanding a premium is paid for longer staple varieties. Some times the premium paid for the better staple cotton is as high as 2 cents per pound, or even more. The reasons that shorter staples are favored by the growers are that they mature earlier, produce a larger percentage of lint, are much easier picked, and always find ready sale at market prices. Picking and ginning are considerable items of expense and since these operations are paid for on a pound basis for cotton in the seed it can readily be seen that the higher the percentage of lint the more profitable is the crop.

A long growing season is required to produce cotton successfully. In addition to this, warm day and night temperatures are needed. Cotton has been grown in some sections which had a long growing season but where temperatures were moderate during the day and cool at night. The results were disappointing because a

sufficient number of the bolls did not come to maturity.

To produce satisfactory yields of cotton good cultural methods must be followed and special attention given to the preparation of the seed bed, moisture in the soil, good seed strains, clean cultivation, and maintaining soil fertility.

Cotton should be grown in a systematic and well planned crop rotation and should not be on the same ground more than once in three years. A rotation which has proved highly satisfactory through long trial in Turkestan, an old cotton-producing country with soil and climatic conditions similar to those in the cotton-growing sections of Arizona, is as follows: (1) Cotton, two years; (2) corn, followed by a green manure crop such as cowpeas or lepeary beans, one year; (3) barley, followed by a green manure crop, one year; (4) cotton, one year; and (5) alfalfa, three years. Most of the older agricultural countries have found it necessary to keep lands in soil-building crops approximately 50 per cent of the time. The foregoing rotation meets this provision and also contains the two leading crops for southern Arizona—namely, cotton and alfalfa.

On land that has grown cotton the previous year the following practice is generally followed. The standing stalks are cut with a one-row stalk cutter as soon as they are dry and brittle after fall frosts. Since the land is dry, a winter irrigation is given before plowing. This irrigation permits deep plowing, from 6 to 8 inches in depth, and adds to the stored moisture in the soil. This saves on the amount of the summer irrigation needed to produce the crop and also puts off the time of the first irrigation, which experience has shown is desirable. The winter plowing is usually done in January.

Preparation of the land to receive the seed is done in the spring. This may include a second plowing but usually it does not. The plowed land is double harrowed, disced, or smoothed with a heavy drag. Some advocate a heavy irrigation at this time, which is best accomplished with a moderately cloddy surface. Others have found that an irrigation in which the amount of water used is equivalent to

covering the land 6 inches in depth is sufficient and can best be applied to a reasonably smooth surface. As soon as the land is dry enough to work, it is double disced and given as many harrowings with a drag harrow as are necessary to obtain a fine, well firmed seed bed, and then floated before planting. These extensive cultivations are threefold in their purpose—first to establish a desirable seed bed, second to eradicate foul weed growths, and third to conserve moisture.

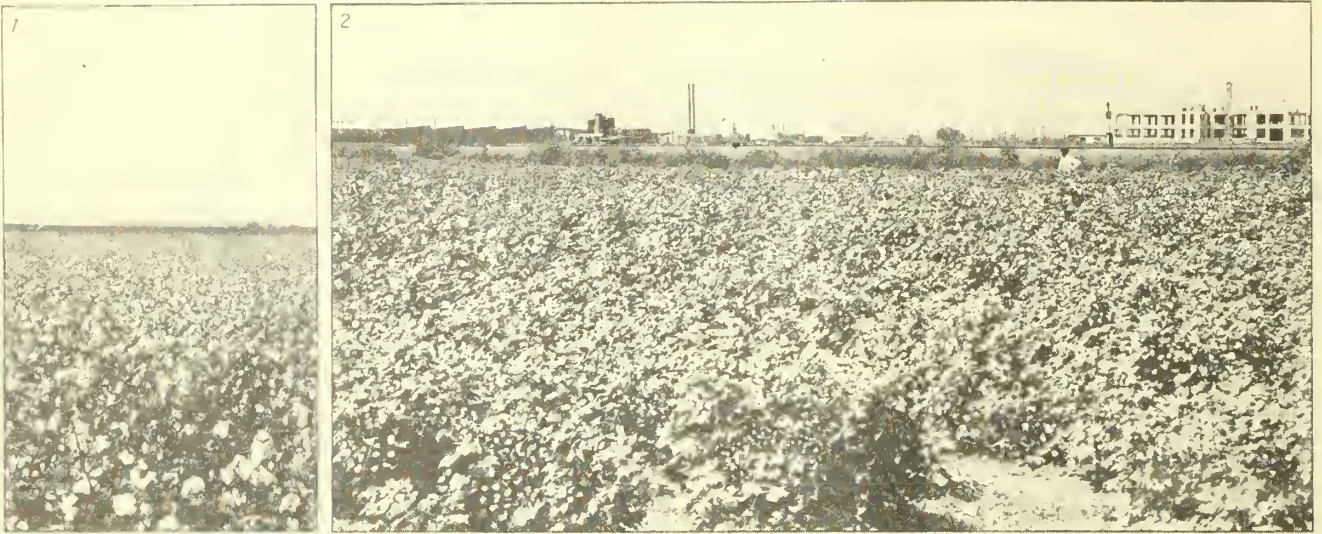
Many growers advocate the lapse of a few days, or even a week, before planting to allow the seed bed to become warm, but without allowing the soil to become unduly dry. Generally flat planting is considered best, using disc furrow openers set just deep enough to push aside the dry surface clods, which insures uniform depth of planting in moist soil. A few ridge their field before planting and then plant the seed in the ridges. The character of soil determines which system is preferable. The planting is done with an ordinary two-row cotton planter, with preference for the open wheel type. The seed is planted from $1\frac{1}{2}$ to 2 inches deep in rows $3\frac{1}{2}$ feet apart. From 25 to 30 pounds of seed are used per acre. One of the most common mistakes made by inexperienced growers is planting the seed too deep. On the Carlsbad project the average dates of planting are from the 10th to the 25th of April.

It is important that a uniform stand of plants be secured, as without this good yields of cotton can not be obtained. Good seed bed preparation and subsequent operations have much to do with it. After the seed is planted driving rains may cause a crust to form on the surface of the soil, which, if left undisturbed, will not permit the young plants to come through. This condition is relieved by an immediate light harrowing.

The above methods are common when cotton follows cotton, milo, maize, or other row crops. If an alfalfa field is to be prepared for cotton growing, it is best to plow the land shallow in early or mid summer with a sharp plow, which will cut off the crowns of the alfalfa plants, follow with a disking, and seed the land to begira or milo maize. Subsequent cultivations destroy weeds, assist in eradicating the remaining alfalfa plants, and leave the land quite clean for cotton the following year.

Usually the first cultivation of cotton can be done with a harrow crosswise to

(Continued on page 9)



1, 4, and 5, a two-bale to the acre cotton crop on the Carlsbad project; 2, a cotton field near El Paso on the Rio Grande project; 3, cotton growing on Senator Winsor's ranch on the Yuma project

COTTON ON SOUTHWESTERN PROJECTS

(Continued from page 7)

the rows. Subsequent cultivations should be frequent, stirring the soil to a depth of 3 or 4 inches and at intervals of a week to 10 days apart.

When the plants begin to show their third or fourth leaf, they are thinned. Practice varies somewhat in different localities. In some districts plants are left at intervals of 12 to 14 inches in the rows, whereas in other localities they are left from 6 to 10 inches apart. It is claimed that crowding the plants in the rows tends to force early blooming and maturity.

After thinning cultivation should be shallow and repeated often. The location and extension of root growth determine the proper depth of cultivation. On a light sandy soil it is said that the taproot of a cotton plant may penetrate to a depth of 3 feet; on heavy soils the taproot may not reach more than a depth of 1 foot and then direct its course more or less horizontally. Many of the lateral roots start from the plant near the surface and may not penetrate the soil to depths of more than 8 to 10 inches. These habits of root growth indicate the advisability of shallow cultivation.

The first irrigation after the plants are up should be delayed as long as possible without adversely affecting the vigor of the plants. This period varies from six weeks to two months. Generally water is applied by the furrow method, although some irrigate by the border system. It is better not to flood the plants if it can be avoided. From two to five irrigations are given to mature the crop. Frequency of irrigation is determined by the moisture conditions of the soil. The practice is to not allow plants to suffer or show signs of wilting after irrigation has once begun. If plants become too dry they shed young bolls and squares, thus reducing the possible crop. Cultivation should follow promptly after each irrigation.

Harvesting usually commences in October and the cotton is picked by hand and hauled to the gin. The picking is done largely by Mexican laborers. The price paid varies from \$1 to \$1.75 per 100 pounds, depending on the locality. The cost of ginning is \$7.50 a bale, which includes bagging and ties. Harvesting is often not completed until January. The long dry period at picking time and the late arrival of frost in the Southwest permit going over the fields several times. Late blossoming fruit is therefore saved.

The current prices so far obtained in 1924 have been from 23 to 26 cents per pound for the average lists of cotton sold. Cottonseed has been selling at \$16 to \$22 per ton and is purchased by cotton-oil mills. Several cotton-oil mills are under construction on or near the projects, which are being largely financed by the growers, and better prices are anticipated for cottonseed in the future.

A bale of lint cotton weighs approximately 500 pounds and a yield of one bale per acre is considered very profitable and satisfactory. Maximum yields of 1½ to 2 bales per acre are being obtained under most favorable conditions. The average yield of cotton on the Carlsbad project is estimated to be two-thirds bale per acre, or a gross yield of 14,000 bales for the project.

The cost of growing is, of course, variable but is approximately \$45 an acre, based on a one-half-bale crop. This cost would include picking and water charges.

There are 25 gins located on the Rio Grande project and the other projects are equally well served.

Buyers representing the various cotton firms are always on hand on the different projects and competition is keen for the better grades of lint, which no doubt accounts for the prices obtained approximating those received at New Orleans and New York.

The cotton fields on the projects have been fortunate in not being affected by serious insect pests or plant diseases. In other sections of the country the cotton-boll weevil is responsible for large crop losses, but apparently it does not thrive in a dry climate. Slight losses have occurred in restricted areas on the projects by the cotton bollworm, but it has been held in close check by cultural methods and spraying.

The future for cotton production on these projects appears to be very promising, especially if soil fertility can be maintained. A proper crop rotation should be followed on each farm, in which alfalfa, fed to livestock, should find a prominent place. Hope lies also in careful seed selection, already recognized and practiced by many growers. The adoption of one variety of cotton for a locality is desirable, when possible; it would permit standardization of quality and prevent cross-pollination as well as develop a market for a certain length of staple.

BRITISH COLONISTS FOR CANADIAN LAND

At the request of Commissioner Mead, Hon. F. C. Blair, acting deputy minister of immigration and colonization, Ottawa, Canada, has furnished the following statement concerning the arrangements recently completed by the British and Canadian authorities for the settlement on Canadian land of 3,000 British agricultural families:

The details, in connection with this scheme, were arranged with the Imperial Government by the minister of immigration and colonization during a recent visit to Great Britain. The Imperial authorities have agreed to advance \$4,500,000 to assist British agriculturists to come to Canada and engage in farming. None but bona fide farmers, who intend to continue their occupation in Canada, will be eligible for a loan, and, while no specific amount is allowed in each case, the loans will be fixed according to the immediate needs of each family. These loans will be repayable over a period of 25 years. The Dominion Government assumes no financial responsibility whatever in the matter. The families will be placed on land already owned by the Canadian Government, and this department will not only have the right of selection but also the placing of the families on arrival. The necessary staff to carry on the work of selection will shortly proceed to Great Britain and it is expected that in the early spring a considerable number of British agricultural families will be coming forward and settled throughout the various Provinces.

EMPLOYEES OF BUREAU DURING PAST 11 YEARS

The accompanying statement shows the fluctuations in the number of employees of the Bureau of Reclamation, including laborers, during the past 11 years, as of the month of June:

1924 (exclusive of Salt River).....	4,476
1923 (exclusive of Salt River).....	4,740
1922 (exclusive of Salt River).....	3,667
1921 (exclusive of Salt River).....	4,507
1920 (exclusive of Salt River).....	3,783
1919 (exclusive of Salt River).....	3,819
1918 (exclusive of Salt River).....	5,288
1917.....	6,483
1916.....	5,410
1915.....	8,373
1914.....	8,170

The old pioneer settlement with its primitive farming is impossible under present conditions.

IRRIGATION HINTS FROM A PRACTICAL IRRIGATOR

I. D. O'Donnell, formerly connected with the Bureau of Reclamation and one of the foremost practical authorities on irrigation methods, tells the Montana Irrigation and Drainage Institute how to get results

WE are taking it for granted that the farm we are now about to begin irrigation on has the water delivered to the highest point.

The first important point to consider is the system to install or the plan of irrigation best adapted to the locality or to the lay of the land and also to the style of farming contemplated. Thus far in Montana the general system that has been adopted is what is called the lateral or flooding system, with the furrow system where applicable, as in orchards or crops such as potatoes, corn, sugar beets, and others where cultivation is necessary. The lateral system is by far the most economical, cheapest, and best adapted to the beginner in irrigation, in that it does not require any intensive system of leveling and grading. The water is led around by gravity and on contours to the high points and then let flood over the intervening spaces. The permanent laterals lead along the headlines of the farm, then the main distributing laterals to all the high points in the fields following lines of

least resistance. Some of these may require levees through the low places and occasionally cuts through some of the highest points. In some places it might even be cheaper to make flumes over the low places, but if possible the fill will be much cheaper in the long run.

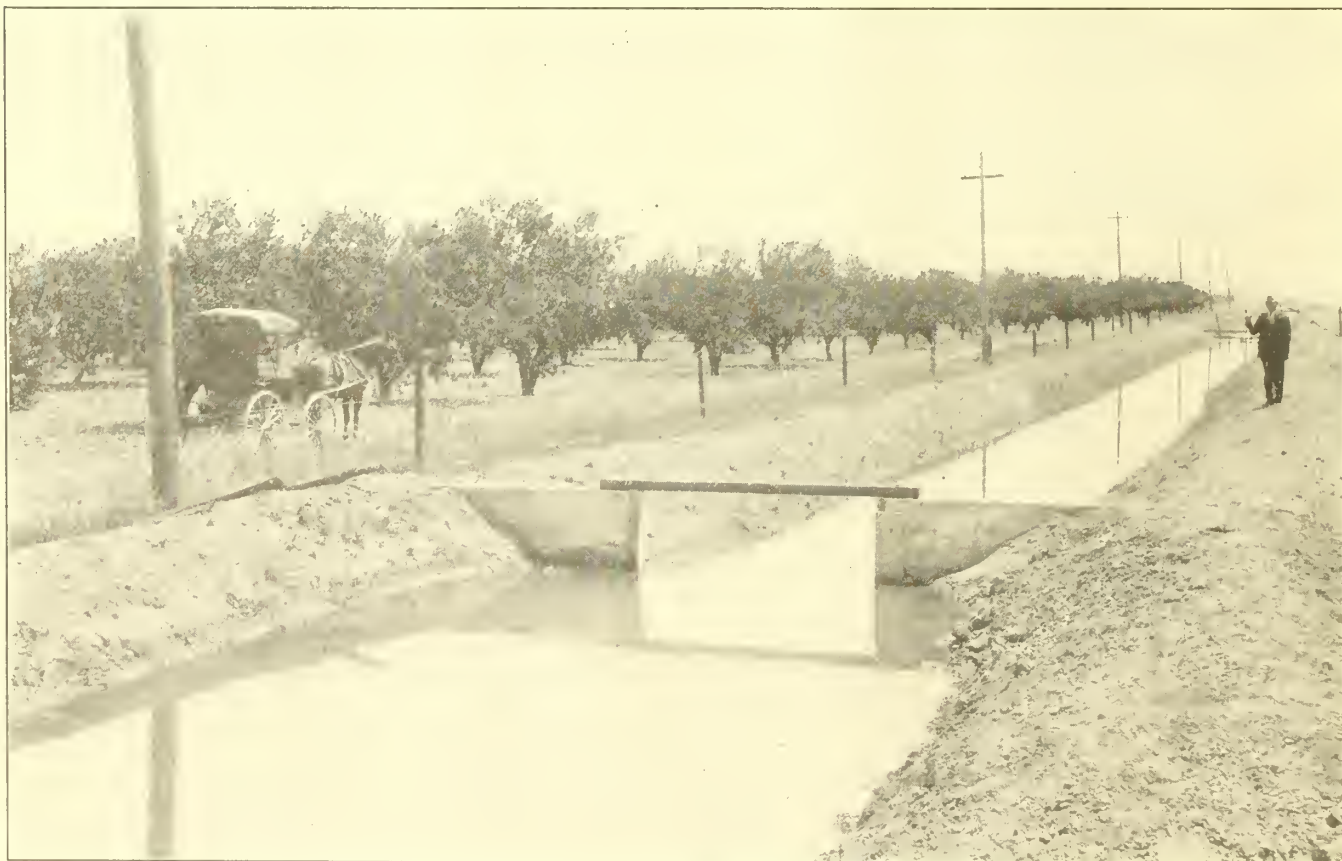
After once found to be in the right place these laterals should be left for good, and the fills and banks sown with Dutch clover, brome, or some good grass that will hold the soil, provide permanent pasture, and prevent the seeding and growing of weeds.

Field laterals.—The balance of the lateral system, by which I mean the temporary laterals, will be made as you seed the farm. These will or should conform to the crops seeded and to the lay of the land. If your farm is fairly level with reasonable slope for irrigation, then nice straight ditches should be made close enough together so that the water will spread between. If the land slopes two ways then the ditches can be run on the bias and good results obtained. In aver-

age Montana soil these ditches should not be more than 50 feet apart. If your land is rolling then the laterals will be made on the contours so as to flood down the slope to the next lateral. In alfalfa and like crops where the land is plowed each season it is better to plow these laterals in. We find that filling in and making new each year avoids a great many weeds and pests. We also find that these ditch spaces are very highly fertilized with silt and so should be moved over each year to gain the full advantage of such conditions.

Size of laterals.—Now that we have the general idea of the land in our mind we will go back over the work to see just what is most important. First, it is a good idea to make all these systems good and at least double capacity. Like a great railroad bridge, plan for the heaviest load, then add another 100 per cent in ease of emergency. In all systems there are times when a farmer can get an extra supply of water if he is only ready to grab

(Continued on page 11)



Looking down one of the laterals on the Orland project, with almond orchard in the background

PLANS FOR PROJECT REAPPRAISALS

FORMER Gov. Thomas E. Campbell, of Arizona, and Dr. John A. Widsøe, of Utah, will be chairman of two committees to survey Federal reclamation projects and carry out the reappraisal provisions of the new reclamation law contained in the recent deficiency act, it has been announced by Secretary Work.

Plans being consummated by the Bureau of Reclamation provide for an investigation of 21 of the 25 Government reclamation projects. Two separate committees will be organized, each committee to have charge of surveying one-half of the projects. Governor Campbell, who is to head one of them, was chairman of the Fact Finding Committee on Reclamation and Doctor Widsøe, who will head the other, served as secretary of the Fact Finding Committee.

The surveys will ascertain the facts on each project where, on account of lack of

fertility in the soil, an inadequate water supply, or other physical causes, the settlers are unable to pay construction costs. They will also investigate whether the cost is being charged upon a smaller area of land than the total area of land on the projects. The results of these surveys will be reported to Congress by the Secretary of the Interior in accordance with the provisions of the new reclamation law.

Although the organization plans of the two committees have not been completed, it is certain that one representative from each State, to be appointed by the governor, will act in investigating the projects located within his particular State. The Acting Chief Engineer and the Director of Reclamation Economics of the Reclamation Bureau will, where desired, act in an advisory capacity to the com-

mittees. Additional members have not been decided upon.

The projects to be surveyed for the purpose of ascertaining lack of fertility in the soil, inadequate water supply, or other physical causes responsible for the inability of water users to make their construction payments, including charges on too small an area of land include: Yuma, Arizona-California; Orland, California; Grand Valley and Uncompahgre, Colorado; Boise, King Hill, and Minidoka, Idaho; Huntley, Milk River, and Sun River, Montana; Lower Yellowstone, Montana-North Dakota; North Platte, Nebraska-Wyoming; Newlands, Nevada; Carlsbad, New Mexico; Rio Grande, New Mexico-Texas; Umatilla, Oregon; Klamath, Oregon-California; Belle Fourche, South Dakota; Strawberry Valley, Utah; Okanogan and Yakima, Washington; Shoshone, Wyoming.

The surveys are to be conducted during the coming spring and summer and are expected to be completed in time to report the facts to Congress at its regular session in December, 1925.

PRACTICAL IRRIGATION HINTS

(Continued from page 10)

it. So by all means be prepared for extra water if it should come. The extra work and space taken for it are small compared to the advantage it may be to you.

Plenty of field laterals.—The next thing down the line is that in all field laterals do not be afraid to plow up a little land. The great conservator in both labor and water is plenty of laterals. Short runs, both in furrow and field, speak successful irrigation. Fifty-foot spread and 400-foot or less run are better than 100-foot spread and 800-foot run. Make all your field systems right after seeding. Do not wait with the idea that you might not have to irrigate. That speaks failure right off the bat. With the ditches made early, the dirt will settle, the crops grow up through the banks, and they will hold water much better and be far less trouble. That old motto, "Better be ready and not go than to go and not be ready," applies well to this case.

Better farming.—At this point I think is the time to say a word for better farming, as it is here that irrigation plays its part for good or for bad. The better the farming the less irrigation required. Good thorough cultivation with a reasonable amount of fertilization will save one irrigation on the average crop that is usually irrigated twice. In other words, fertile soils require less water than poor soils, or at least retain moisture better. A good top dressing of manure on alfalfa will eliminate one irrigation. Fall plow-

ing will usually do the same. In fact, one secret of irrigation is to avoid it whenever possible. Cultivation before and after irrigation should be your motto.

Amount of water.—On most of Montana soils, good irrigation is putting the water on and off again reasonably quickly, except in the cases of some furrow irrigation such as potatoes, where it is necessary at times to let the water work through. In a great many of our lighter soils, 6 acre-inches is about as light as we can put it on in an irrigation, and this is far more than is needed.

The average farmer irrigates just a little too soon, and usually once too late. Most of the small grains do not need irrigation after it passes out of the boot or early head. Six inches of water will pass on through the average soil and some of it be wasted. In some of the better and older systems they are able to put on, by use of large heads, 2 or 3 inches of water in one irrigation. We should study the results of nature's work. For instance, on dry land with good farming, with 6 to 9 inches of rainfall in the growing season, they can raise 40 bushels of wheat.

Tools and equipment.—There are a great many ditchers on the market, but any farmer can make homemade tools that will answer all purposes. The first is a land level for finishing off all fields before seeding. Pulled across the field it will fill all dead furrows and will level back furrows and fill all voids. This machine will

also do considerable general smoothing and elod crushing. Next we need a ditcher of some kind. A common 18-inch lister or double plow makes a very good lateral. One or two furrows with a common plow and then a trip through with a go-devil or a log will do the work. On my own farm I have a ditcher made from two right and left 14-inch walking plows bolted together, pulled by four horses. There is also a homemade rig for making dams, called a dammer, that is useful at times. There are various kinds of dams—metal, canvas, and wood. Each is very good in its place. The farmer should decide which is best suited for use on his own farm. Another plan which I have found very good is to make a number of dams, especially in grains, when you make the ditches. This prevents loss of water and time in the rush hours of irrigation. A good point, not always remembered, is to place your dams in the high places. Avoid the low spots. They will take care of themselves when it comes to getting their share of the water.

Keep the laterals clean. A clean lateral means water saved, and on an irrigated farm water saved means cash saved. Main laterals should be cleaned at least twice a year. Last but not least, get a good honest man who will use his head as well as his hands, and give him a good shovel. The shovel I like should not be too heavy, fairly straight, with small shank and sharpened daily or oftener. Tell your man not to try to dig up the whole farm, but just to get in front of the on-coming water and keep it blocked.

A SUCCESSFUL GRAPEFRUIT GROVE ON THE YUMA MESA

The possibilities of the Yuma Mesa as a producing area for grapefruit are shown in this article, which describes the results obtained by Mr. George Hill and outlines future plans.

GEORGE C. KREUTZER, Director of Farm Economics of the Bureau of Reclamation, recently visited the Yuma project and in the course of his trip over the project inspected one of the developed grapefruit groves on the Mesa which he describes as follows:

The Yuma Mesa is a tract of table-land lying above the plane of the Yuma Valley. The soil is sandy in character and is suited to the production of semi-tropical fruits and vegetables. The Yuma Valley affords excellent air drainage, which accounts for the long frost-free period.

There are 45,000 acres in the Mesa, but only 3,000 acres are ditched and piped. Only 400 acres of this area are planted to fruit.

Mr. George Hill, a skilled citriculturist who had rejuvenated two groves in southern California, came to Yuma nine years ago and started the development of a 10-acre grapefruit grove on the Yuma Mesa. He carefully leveled the land, installed pipe lines and valves, and planted the area to selected grapefruit stock, planting the trees 24 feet apart. After allowing for roads, 800 trees were set out on the 10 acres.

There is nothing cheap about developing one of these orchards. The figures

given by Mr. Hill show that it costs about \$600 an acre the first year exclusive of the cost of land and water right, and from \$160 to \$225 an acre each succeeding year. Some crop will be borne the fourth year, and approximately four boxes per tree the fifth year, which, credited to the expenses, leaves a net investment of \$1,000 an acre, or \$10,000 for a 10-acre grove including land and water right. This is from \$500 to \$1,000 less than in proven sections elsewhere.

On November 5, 1924, this grove was visited just as the fruit was ripening, and the yield was approximately six to eight boxes, of 50 pounds each, to the tree. Mr. Hill stated that the entire crop had been sold at 5 cents a pound orchard run. This high price was being obtained because of the excellent quality of the fruit, which was of uniform size, typical shape, and of fine texture and flavor. The sturdiness and vigor of the trees are remarkable, owing to proper fertilization and irrigation methods. Each year 20 to 30 tons of barnyard manure are applied to each acre, supplemented by superphosphate and other commercial fertilizers. These fertilizers are plowed into the orchard in furrows located at the extreme limits of tree growth, commonly called at the point of "drip," so named be-

cause of rain running off the leaves to the ground surface.

To each tree is attached a card upon which are recorded the yield and grade of fruit grown. These records are kept yearly and serve the same purpose as cow-testing records do for the modern dairyman. Trees producing poor quality or poor yields are top worked by using buds from trees of known high production.

Cover crops of purple vetch and hubam clover are grown in the winter and plowed under in the spring, which adds humus and consequent fertilizers to the soil.

This grove demonstrates that the Mesa will become one of the large producing areas of grapefruit in the southwest. It also demonstrates the value of planting nursery stock of known quality and following with proper methods of fertilization, irrigation, and cultivation to produce high quality and yield.

Mr. Hill is also developing 200 acres of similar land on the Mesa for a syndicate in which members own from 5 to 10 acres. Each member owns a definite plot of land, but the cost of irrigation, fertilizing, cultivation, and care is pooled and paid for on an acre basis. The syndicate grove shows the same vigor and care in cultivation as are shown on Mr. Hill's

(Continued on page 13)



A grapefruit grove on Colonel Fly's "beloved Yuma Mesa"

FIELD ORGANIZATION CHANGES

THE Secretary of the Interior has promulgated the following orders relating to changes in organization and titles in the Denver and field offices of the Bureau of Reclamation, effective January 1, 1925:

DECEMBER 4, 1924.

ORDER

So much of the order of April 9, 1924, as relates to changes in titles in the Bureau of Reclamation is hereby amended effective January 1, 1925, as follows: "Project Managers are designated 'Superintendents of Ditches'" to "Superintendents of Ditches are designated 'Superintendents,'" with the same duties as defined in the above-mentioned order.

HUBERT WORK,
Secretary.

DECEMBER 9, 1924.

ORDER

Effective January 1, 1925, there is hereby established in the Bureau of Reclamation a Division of Reclamation Economics to be in charge of a Director of Reclamation Economics (now Mr. George C. Kreutzer).

Under the supervision of the Commissioner of the Bureau of Reclamation, the Director of Reclamation Economics, with headquarters at a point designated by law or by the Secretary of the Interior (now Denver) shall have charge of the investigation of economic problems connected with the development of existing or proposed reclamation projects, including the classification and settlement of land and the improvement of the industrial, agricultural, and social conditions of settlers. He shall also have charge of the activities of the bureau looking to cooperation with agencies designed to promote improvements in agriculture and in cooperative organization of communities.

All previous orders are amended accordingly including order and organization chart of April 9, 1924, which refer to the Director of Farm Economics, which office is hereby abolished January 1, 1925.

HUBERT WORK,
Secretary.

DECEMBER 9, 1924.

ORDER

Effective January 1, 1925, the following changes are ordered in the organiza-

ROUTE YOUR LETTERS THROUGH THE PROJECT

With a view to the efficient handling of the largely increased work of the Bureau of Reclamation resulting from the new reclamation legislation, it is suggested that water users, instead of writing direct to the Commissioner concerning their problems, route their letters through the Superintendents or District Counsel. The accompanying orders of the Secretary centralize authority on the projects in the Superintendents. They and the District Counsel know the local problems and view them sympathetically. Sending letters to the Commissioner through them will save time in referring many such letters back to the project for report because of lack of full knowledge of the case in the Washington office.

tion of the Bureau of Reclamation, Department of the Interior:

Chief Engineer.—Under the supervision of the Commissioner, the Chief Engineer, with office at a point designated by the Secretary of the Interior (now Denver), shall have charge of all matters relating to engineering investigation, construction, operation, and maintenance of the projects and of all employees of the Denver offices, with the exception of the Director of Reclamation Economics and his force, and of the legal staff maintained at that point. The Chief Engineer shall report to the Commissioner.

Director of Reclamation Economics.—Under the supervision of the Commissioner of the Bureau of Reclamation, the Director of Reclamation Economics, with headquarters at a point designated by law or by the Secretary of the Interior (now Denver) shall have charge of the investigation of economic problems connected with the development of existing or proposed reclamation projects, including the classification and settlement of land and the improvement of the industrial, agricultural, and social conditions of settlers. He shall also have charge of the activities of the bureau looking to cooperation with agencies designed to promote improvements in agriculture and in cooperative organization of communities. The Director of Reclamation Economics shall report to the Commissioner.

Superintendents.—Under the supervision of the Commissioner and the Chief Engineer, Superintendents, with offices designated by the Commissioner, shall have charge of all employees with the exception of the District Counsel and their force, and of all work connected with the construction and operation of their respective projects, including the execution of all contracts which under present regulations are executed on the projects. Superintendents shall report to the Chief Engineer.

Denver Office Manager.—The office of Office Manager is abolished and the title of the incumbent changed to Chief Clerk, who will perform the usual duties of that position. The Chief Clerk shall report to the Chief Engineer.

The general effect of the above changes is to centralize authority on the projects in the Superintendent, and in the Denver office in the Chief Engineer.

All previous orders are amended accordingly.

HUBERT WORK,
Secretary of the Interior.

YUMA MESA GRAPEFRUIT GROVE

(Continued from page 12)

grove. The trees on the 200 acres are one and two years old, and the stand is remarkable, less than 1 per cent failing to start. It is an example of what skill and experience can accomplish in a highly technical industry.

The chamber of commerce, presidents of banks, and other influential citizens are planning the organization of a large corporation, financed locally, to develop such areas extensively on a cost plus basis with the idea of bringing a large area of small individual farms to the bearing stage, in an effort to make the Mesa a producing area to develop their community. With

that ideal in view the development should succeed. There is a field for this activity, as this work might better be done for the average settler at cost plus than to allow him to shift for himself.

The Mesa should prove a highly desirable grapefruit section offering good returns for the money invested, but the success of a developing corporation will depend entirely upon the service rendered. If the first group of settlers is given real service in which profit is not the main feature, the corporation should prosper and find applicants readily.

AUSTRALIA'S DAWSON VALLEY IRRIGATION PROJECT

The reservoir will supply water for 200,000 acres of first-class agricultural land and 2,000,000 acres of pastoral or stock land, all of which is at present unused.

A BRIEF statement concerning the official opening of the first section of the Dawson Valley irrigation project was printed in the October issue of the NEW RECLAMATION ERA. At the request of Commissioner Mead, Mr. A. F. Patridge, of the Irrigation and Water Supply Commission of Queensland, Australia, has furnished the following additional information:

Queensland's irrigation project in the Dawson River valley is unique in the world's age-old history of this branch of engineering and agriculture, when construction quantities are considered in relation to storage. The latter will total 2,500,000 acre feet, and equals that of the Elephant Butte reservoir on the Rio Grande project. The material used in the construction of this dam was 600,000 cubic yards, whereas only approximately 110,000 cubic yards will build the Nathan Dam in Queensland, and a slight addition to this content would materially increase the storage if so desired. The plan comprises—

1. A reservoir on the Dawson River, about 180 miles inland, with a catchment of 9,000 square miles and an average rainfall over this area of 27 inches.

2. An overtake dam, 27 miles down, for the diversion of water from the river into a main canal flowing through the irrigable lands.

3. The irrigation by gravity of so large a proportion of the fertile river flats scrub lands commanded as will be determined by the quantity of water available, and the behavior of the reservoir. It was estimated in a previous statement that the reservoir would supply water for 200,000 acres of first-class agricultural land and 2,000,000 acres of pastoral or stock land.

The storage dam will rise 130 feet above the summer level of the Dawson River, and will have a crest length of 860 feet. The cost will be more than \$10,000,000. The overtake weir will raise water 21 feet above the present summer water level.

Work is in progress for the irrigation of 5,000 acres from above storage prior to commencing the large reservoir works. Only the top levels of the stored water could be drawn off by gravity, so it will be passed down the river 24 miles to Castle Creek and lifted by pumps to the river bank. It will then irrigate the 5,000 acres by gravity, and the canal system put in for this purpose will be

incorporated later with the main plan. Settlement can thus be started before the large works are put in hand, and gradually extended from this center as stored water becomes available. For the guidance of settlers and determining the best marketable products, the first work has been the establishment of an experimental farm at Castle Creek, where 150 acres have been cleared, fenced, partly plowed, and divided into plots. By the end of 1924 it was anticipated that the pumps would be working and planting well forward.

The irrigable lands are all the property of the Crown, though at present used for grazing purposes under various forms of leasehold tenure. The soils are of various colors and mechanical constituents, but all are shown by chemical analysis to be good agricultural land with open texture and good capillarity, suitable for irrigation and capable of growing any crop. In addition, humus is good and soils contain liberal amounts of all mineral plant foods in readily available form.

The preliminary 5,000 acres at Castle Creek can probably be filled with farmers from Queensland and other States without seeking settlers from abroad. Before being allotted farms full particulars of their experience and finances will be recorded and their suitability or otherwise determined. It is recognized that advances will be needed, which will probably be set at a maximum of \$2,000 to include house, implements, stock, and improvements. Where no improvements exist, as in the case of a newly selected farm, advances will be made gradually as the block is improved, and the settler's capability established. It is recognized, however, that the man who accepts State assistance only as a last resort is likely to prove the most desirable.

The amount of capital needed to take up a farm depends upon the area desired, and the experience, industry, and capability of the settler. A man with experience of Australian agriculture, in a position to do his own work, should manage on a capital of \$2,000. The building of expensive houses will not be countenanced, as the money can be put to better use in the land or in stock. Improved housing can come later. Men without money and without experience will be treated as undesirable, and spoon-feeding of the settlers will not be entertained. Judicious financial assistance is chiefly contemplated as an inducement to settlement where families have ex-

perience, are capable and willing to work, but are not financially strong enough without assistance. Pending a definite policy the extent of such assistance will not be bound by hard and fast rules.

After the farms are settled the next question is the profitable disposal of the produce. No dictation is proposed regarding the class of crop to be grown, nor how to dispose of it. The officers of the commission, if desired, will advise on this subject. Unity of action with his fellows will be to the advantage of each farmer, and by this means cooperative effort will be evolved, and the administration will work with this ultimate end in view.

To insure cheapness of production and handling, also economy in irrigating, it will be an advantage to set apart areas for certain products for specializing in them. Some crops need irrigation more frequently than others, and at different periods from others, and it is more economical to deal with compact sections of similar crops than scattered farms with varying products. For instance, a 1,000-acre section might be suitable for tobacco, so that drying kilns and treatment plant would be best suited in that area. Dairying and pig raising would require butter and cheese factories and bacon-curing plants.

A modern garden township has been laid out in the center of the area, situated on the banks of the Dawson River. The commissioner's office staff cottages have already been erected, and business sites will shortly be made available. A temporary sawmill was one of the earliest undertakings, and the permanent mill is now nearing completion. Blue gum logs available on the area provide excellent hardwood, and this mill should prove a factor later in reducing the cost of settler's cottages. The designs so far have been prepared with a view to reasonable comfort at a moderate cost, and plenty of veranda space has been provided.

The disposal of the produce grown in such a large area is an important question. The production of fresh fruits in this State has often exceeded the demand. This has not been due to overproduction, but to underconsumption, because the retail price to the consumer is too high for any but the well-to-do. When both apple growing in Tasmania and dairying in Australia increased by leaps and bounds, the bogey of overproduction was raised, but both are stabilized and capable of further expansion.

SUCCESSFUL FARMING COMMUNITIES

IN the issue of "The New Palestine" of March 7, 1924, Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, tells what is being done by the Jewish Colonization Association and the Zionist Organization in the agricultural restoration of Palestine along well-planned, scientific lines. Doctor Mead points out that "the rural colonization of Palestine is now past its pioneer period. It needs to be organized for the larger expenditures involved in the complete occupation and development of the valleys, leaving the mountains for later attention. These things need attention: Money and plans for financing land buying, working out coordination plans for irrigation and drainage, first to protect health, next to create the best type of agriculture, and finally the determination of the size of farms, which will create small homes for the small farm laborer, and larger homes for the man who has help in his family or ability to direct work of others."

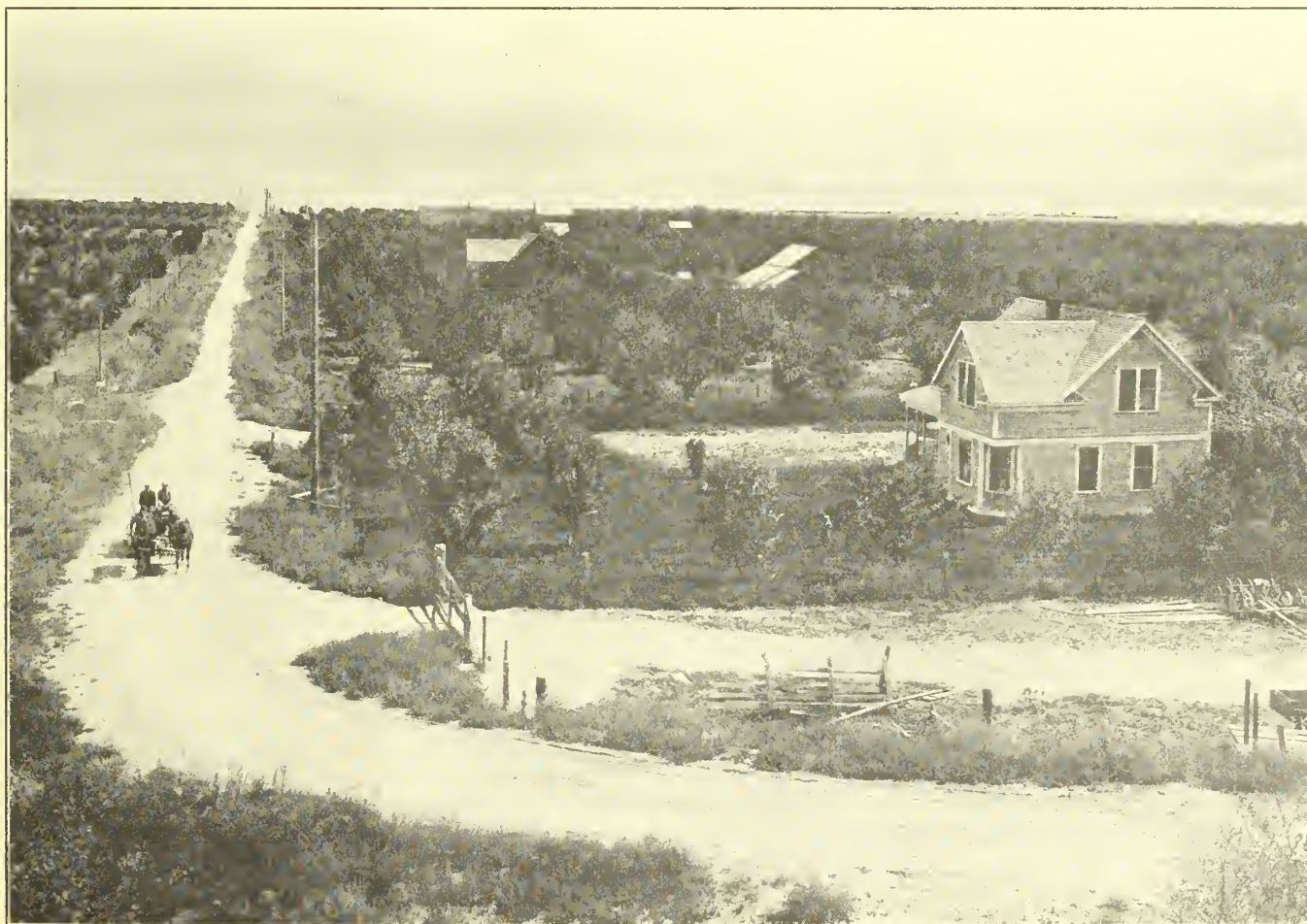
Farm advisers should form a prominent part of successful community development, as outlined by Doctor Mead in the following extracts from the article:

"I went to Palestine from Australia which, all things considered, has given more attention to colonization and has thought out its requirements to its fundamentals more thoroughly than any other country. The plan adopted in Australia, and later copied with great success in California, is to install in each settlement as an adviser a man who has a thorough knowledge of agricultural practice, who has sagacity in business, and personality to lead men to follow him because of confidence in his sympathetic interest and his knowledge of his calling. I have from time to time visited similar settlements in Germany, Denmark, and England, and in all of them the most important individual connected with the colonization is the farmer-adviser.

"A few years ago the Department of Agriculture and Fisheries in England

made a very thorough study of this subject. Their conclusion was that settlements should be made in groups of not less than 100 families, and up to 400 families there is a constant decrease in overhead with no loss of efficiency. Beyond that the power of a single adviser loses itself. He can not give personal attention to the individual.

"In all of these colonies, the idea is to give a man land enough to keep himself and his family fully occupied and to provide money enough to equip the farm so that its cultivator can work with good tools, good stock, and be helped to cultivate with science and skill. These farm advisers can be and are of the greatest possible value in helping people brought together, without previous knowledge of each other, to work together in those things that the community can do better than the individual: Cooperation in buying and selling, in the purchase of livestock and equipment, in financing, things that the community must have, like packing sheds for fruit, cooling and shipping stations for milk, and arrangements for marketing, which will place the man on 10 acres within a colony on an equality with the man owning 1,000 acres outside."



Choice fruit trees on the Okanogan project

SUGAR-BEET GROWERS MAKE PLANS FOR 1925

A very enthusiastic meeting of the Montana-North Dakota Beet Growers Association was held in Sidney, Mont., on November 26. The meeting was held for the purpose of receiving an announcement by W. L. Lawson, general manager of the Holly Sugar Corporation. Water users and business men from all parts of the Lower Yellowstone project and from the Williston project turned out in such numbers that the Princess Theater was filled to capacity.

Mr. Lawson gave a very interesting and instructive talk on the sugar-beet industry and closed by stating that the Holly Sugar Corporation had decided to erect a 1,200-ton factory on the Lower Yellowstone project [wild applause], work to begin at once.

Contracts for about 9,000 acres of beets on the Lower Yellowstone project and 1,000 acres on the Williston project have been signed up. These contracts run for five years and guarantee a minimum price of \$6 per ton to the growers, with the usual provision for an increase in price,

DAIRYING PROFITS ON BOISE PROJECT

Some idea of the profits to be made from dairy cows on the Boise project Idaho, as well as the grade of cows used for dairy purposes, can be had from the report of the Canyon County Cow Testing Association, as follows:

"Five hundred cows tested during July averaged a production of 30.4 pounds of butterfat and 767 pounds of milk. The high cow in the test produced 66.4 pounds of butterfat and 1,702 pounds of milk. For the entire 500 animals tested in 38 herds the average profit for the month per cow above the feed cost was \$7.95."

depending on the net amount received for the sugar. The corporation absorbs all of the freight on beets from both projects.

Great credit is due the factory committee of the local beet growers association for their untiring efforts to get a factory for this project.

CALIFORNIA PROJECT TO BE INVESTIGATED

A cooperative agreement has been signed by Secretary Work and the Chamber of Commerce of the city of Chico, Calif., for an investigation of a proposed irrigation project in Tehama and Butte counties.

The terms of the cooperative agreement provide that the United States shall make available the sum of \$5,000 immediately upon the deposit by the Chico Chamber of Commerce of a like amount. There is another provision that an additional sum of \$5,000 may be provided by the Government in case an equivalent amount is advanced by the Chico Chamber of Commerce. Under the contract the engineering and other surveys are to be conducted by the Bureau of Reclamation.

The area involved in the proposed project is situated on the east side of the Sacramento River in the vicinity of the city of Chico, which has a population of more than 10,000. Approximately 35,000 acres of land are included in the project and water is to be supplied from Deer Creek and Butte Creek.

FRANK W. KIRKSEY

Information has been received of the death on Thanksgiving Day, at his late home in New Rochelle, N. Y., of Frank W. Kirksey, a former employee of the Bureau of Reclamation. Mr. Kirksey was a member of the field auditing staff of the bureau, stationed for some years at Cody, Wyo., during the construction of the Shoshone Dam, and established an excellent record of faithful and efficient service. The sympathy of the bureau is extended to Mrs. Kirksey and the family in their bereavement.



Drain digging on the North Platte project

The inhibition in the act of March 3, 1921 (41 Stat., 1353) against the granting of rights of way over public lands within national parks and national monuments without specific authority of Congress, is applicable to the extension of canals for the irrigation of Indian lands, and nothing in the act of August 30, 1890 (26 Stat., 371), reserving a right of way for ditches or canals constructed by authority of the United States, or in the appropriation acts providing for the construction of irrigation works for the benefit of the Indians, grants that authority. (Departmental Decision, June 27, 1924.)

NEW RECLAMATION ERA

VOL. 16

FEBRUARY, 1925

NO. 2



Photo by Army Air Service

MINIDOKA DAM AND POWER HOUSE, MINIDOKA IRRIGATION PROJECT, IDAHO

***T**HRIFT is perhaps more important to farmers than any one else, and among other things means living off the farm as far as possible. The farmer who raises crops to sell and buys flour, canned goods, etc., at the store is swapping \$3 for \$1, and it takes a good business to stand that very long. Selling wheat at 75 cents a bushel, or $1\frac{1}{4}$ cents per pound, and buying flour at $3\frac{1}{4}$ cents per pound is one way to lose money, although this is a small matter compared to the difference in cost for package goods. We used to run wheat through a feed grinder and sift out flour, meal, and bran. We also made our own cheese and cured our own ham and bacon. A recently reported farm survey has shown that the farm living, including the house rent, fuel, eggs, milk, meat, vegetables, fruit, etc., used by an average farm family producing diversified crops in the East, would cost from \$75 to \$100 per month if purchased in the city.*

—R. S. STOCKTON.

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

FEBRUARY, 1925

No. 2

COMMISSIONER MEAD URGES NEED OF PROMPT PAYMENT

In statement to representatives of irrigation projects in conference at Denver, beginning January 6, Doctor Mead outlines matters for discussion and stresses the necessity of meeting payments as they mature

PERMIT me to extend to you a hearty welcome and express the hope that your deliberations may be harmonious and of value. If the work of the bureau would permit it, I would be with you, but this is out of the question, and I have written some suggestions intended to help in the work of your conference and in the surveys that it will inaugurate.

This meeting was prompted by a desire to secure the advice and recommendations of many of those who will either participate actively in the surveys to be made, or whose interests will be vitally affected. Constructive suggestions from a practical standpoint will aid in the work which must be done under subsection K of the new law. I therefore earnestly solicit your assistance and cooperation. It will contribute to the preparation of a program for these surveys if each project represented will put in writing a definite statement of the matters which it desires to have considered.

The law recently enacted by Congress embodied most of the recommendations made by the Fact Finders. There is reason to believe that the few omitted will later become part of the law. The act was amended in several features, and the finished product does not include all we had hoped for. There are uncertainties which may be clarified by interpretation on the part of the legal officers of the department.

It must be borne in mind also that certain things may be done under the law, and that others, considered desirable by some, are not within its scope. While I anticipate a full discussion of matters properly to be adjusted and the method best adapted to secure the desired action, may I not express the hope that the conferees will not go beyond the legitimate scope of matters authorized under the law. It should be remembered that adjustments such as those provided for under subsection K must be passed upon by Congress, whose action alone will determine what may be done.

Other important matters are those relating to revision in the method of payments and the operation and maintenance

of projects by the water users as authorized by subsections F and G. This will no doubt receive consideration. Congress has authorized certain forms of relief, conditioned on the water users taking over the operation and maintenance of the projects. The reason for this seems to be a desire to decentralize operation and introduce local responsibility.

ORLAND PROJECT MAINTAINS RECORD

Notwithstanding a loss of approximately 60 per cent in crop production last year, the water users' association of the Orland project in California has notified the Interior Department that its operation and maintenance charges for 1924, when due, would be paid in full.

The Orland project is the only one of the 25 Federal reclamation projects that has made, without deferment, its regular payments to the Government for annual construction costs and operation and maintenance. During the year 1924 this record was severely tested. On June 7 the reservoir was empty and the project settlers had to go through a rainless summer with no water for irrigation purposes after that date. The result was a loss in crops amounting to approximately 60 per cent, including a reduction in the value and quality of the fruit produced.

Although they suffered heavy losses, the settlers on this project met in October and passed a resolution to pay operation and maintenance charges of the current year, without asking for any postponement. This action was based on a desire to keep up the past record of never having failed to pay all amounts due to the Government. Upon receiving notice of the intention of the Orland project to settle, Commissioner Mead of the Bureau of Reclamation expressed his pride and satisfaction over the action of these irrigation farmers in California.

I wish also to call attention to the unmistakable intention of Congress that operation and maintenance charges hereafter accruing must be paid without delay or extension. Under the new law such charges must be paid in advance in all cases where adjustments are made on old projects or where new projects are initiated. The necessity of this has long been recognized by successful private irrigation enterprises.

It should be, and I believe will be, recognized by the thoughtful that the Reclamation Bureau was not created as a credit agency, as was the Finance Corporation and other agencies which I hope to see active in assisting settlers on our projects in refunding their indebtedness and obtaining money on more favorable terms.

I do not believe that we should contemplate any further measures for blanket relief to projects. Whatever relief is extended should be individual in character and adjusted to meet the needs of each case. The difficulty with blanket relief is that in some cases it extends relief to those who are not entitled to it. I refer to cases where holdings are in excess of the farm unit or irrigable area authorized by law, sometimes acquired by speculators, and where the land is held by non-residents and farmed by tenants. The desire of the bureau is to cooperate with the owners of these properties to promote settlement and make this act conform to its original purpose—the creation of communities where the land will all be farmed by its owners.

It is my desire and that of the Secretary that all adjustments necessary to render it possible for payments to be made by the water users will be made under these surveys and that this will be the end of adjustments. There is a growing alarm in Congress and elsewhere that a disposition exists on the part of some landowners, not always measured by the actual necessities, to evade or unduly postpone payments. Water users may by their cooperation in making payments as they mature contribute greatly toward allaying the feeling of distrust which is now being voiced.

ECONOMIC ASPECT OF KITTITAS PROJECT, WASHINGTON

Summary of report by committee of expert advisers shows that the project is permanent and safe from an agricultural standpoint, decidedly attractive, and economically sound and feasible

INTRODUCTION

THE study of the soil and economic conditions of the proposed Kittitas unit of the Yakima reclamation project was started early in July, 1924. It covers a thorough study of the soil, agronomic, and economic conditions of the district, though the time at the disposal of the investigators was very short, and the inquiry necessarily is not as detailed as might be possible had a longer time been available. This is particularly true of the soil data, which are based largely on a previous study made by local men, supplemented by considerable field work by those making the present investigation.

The work was carried on by Charles F. Shaw, professor of soil technology, University of California; B. E. Hayden, industrial agent of the United States Bureau of Reclamation; and George Severance, professor of farm management and vice dean of agriculture, Washington State College; with assistance in drainage investigations from L. T. Jessup, senior drainage engineer, United States Department of Agriculture; and in soil investigations from Mr. Henry Holtz, assistant soil physicist, Washington State College. Acknowledgment is due to the many farmers, business men, and citizens of the Kittitas Valley who freely and fully cooperated with the investigators and made possible the accumulation of the detailed information that was needed. Free use was also made of the data available in previous reports by J. R. Sherman and F. C. Kelsey. Acknowledgment is also due to the University of California for the extension of its facilities during preparation of the report and maps.

SUMMARY

The proposed Kittitas unit of the Yakima reclamation district is located in the central portion of the State of Washington, just east of the Cascade Mountains. It occupies the outer portion of a tilted, basin-like valley, the central portion being already under irrigation.

The topography is reasonably smooth and favorable for irrigation. The elevations vary from 1,700 to 2,100 feet.

The climate is favorable for the production of grain and forage crops. Rainfall varies from 6 to 25 inches in different parts of the project and irrigation is necessary. Winds are severe and persistent in summer.

The irrigation development in the valley has been reasonably successful and shows what can be expected from extensions of the irrigated area.

The duty of water is estimated at 4.286 acre-feet at the point of diversion, or 3 acre-feet delivered to the land.

The soils are generally shallow, underlain by a hardpan resting on gravels, by coarse porous gravels, or by consolidated beds of sands and gravels. The surface soil is of good quality, its producing ability depending upon its depth.

No soil survey was available, but use was made of a "cruise" of a part of the land, supplemented by field study. Measurements showed the following:

Agricultural land:		
Good quality---	20,371.5	
Fair quality----	28,020.5	
		Acres
Pasture land-----	21,925.6	
Total irrigable-----	70,317.6	
Waste land-----	20,071.8	
Total area in district---	90,389.4	

A soil survey, with an accurate soil map supplemented by a detailed topographic map, will be necessary before the actual areas to be included or excluded can be delineated.

Drainage conditions in general are good, though some poorly drained areas will develop.

Most of the land (82 per cent) is in private ownership, 7 per cent is Government land, and 9 per cent belongs to the Northern Pacific Railway and its subsidiaries.

Improved irrigated lands generally are valued at from \$125 to \$350 per acre. Sagebrush desert land is valued at from \$5 to \$15, with some held at much higher prices.

The valley is devoted mainly to the production of grass and grain in about the following proportions: Alfalfa, alfalfa and timothy, or timothy occupies 48 per cent of the land; wheat, 21 per cent; oats, 11 per cent; and pasture, 13 per cent, on good irrigated farms.

Crop yields are high, wheat normally yielding from 40 to 70 bushels, oats, 60 to 100 bushels; and hay, from 1½ to 5 tons.

Most of the hay and grain is shipped out of the valley, the Puget Sound district affording a ready market, probably capable of considerable expansion, sufficient to absorb the added production of the proposed area.

Dairying is successful but not extensive in the valley. It will become more extensive as the price of hay may decrease. Good prices have been received for butter, cream, and cheese.

Range cattle and sheep in considerable number are fed and wintered over in the valley and afford a local market for hay.

Eighty to one hundred acres seem to be the most common and popular size of farms, with 160 to 200 acre farms frequent.

The minimum cost of improvements, stock, and tools for an 80-acre farm is approximately \$4,500, while the purchase and clearing of the land will cost from \$1,500 to \$8,000, making a cost of an equipped and stocked farm of 80 acres lie between \$6,000 and \$12,000.

The gross annual income after the plant is in full operation should lie between \$2,500 and \$3,500.

Settlers should have an initial capital of at least \$2,500. With less than this their chance of success is slight unless special long-time loans at low rates of interest are made available, and lands are purchased at very low prices. If partially developed lands are purchased at from \$50 to \$100 per acre, the settler needs \$4,000 to \$6,000 capital in order to be reasonably sure of carrying through the development period.

The existing irrigation districts are in good financial condition and the farmers generally prosperous.

Bonded indebtedness is low. Lands are assessed on the basis of 40 per cent of their value. Taxes are moderate and delinquencies are small.

Mortgages are apparently stabilized without material increase or decrease and with about \$1,000,000 outstanding, bearing interest at from 5½ to 7½ per cent. Foreclosures are few and the amount generally low.

Credit facilities are fairly good, the local banks having considerable funds available for short-term loans and some for long-time funded debts. Outside capital must be supplied to carry the settlers through the development period.

Educational and social conditions are good and capable of expansion to care for additional population.

The communities are healthful, with no chronic diseases peculiar to the region.

The cost of the project has been estimated at \$8,755,850.11. The gross annual income after full development is estimated at \$1,828,298.90. By a pay-

ment of 5 per cent of the gross returns each year, there would be available annually the sum of \$91,414.95. With adjustment for the period when the land will not be producing full income, the time for full repayment is found to be 96.3 years.

CONCLUSIONS

The area is well located, with a source of water apparently adequate, good climate, and good living conditions.

The soils are of good quality, but are shallow. Crop yields are surprisingly large in view of the depth of the soil.

Grass and grain are the present crops, and there is little probability of any material change, though the production of apples, pears, small fruit, and potatoes may be somewhat extended, and sugar beets are a remote possibility.

Dairying should be encouraged, both to make sure of a market for the forage crop and also to maintain the soil fertility. Continuously selling hay and grain will certainly deplete the soil and materially reduce crop yields.

Farm units should rarely be less than 80 acres in extent on the best-grade soils. Where the areas of poorer soils are considerable, 160 acres or more may be needed to make a farm that will yield an income for a family.

The cost of improvements, stock, and tools will vary from \$4,000 to \$6,000, while the land when cleared and smoothed (or purchased partially developed) will run from \$20 to \$100 or more per acre. The gross annual income after the farm is in full operation will probably be between \$35 and \$40 per acre for the good land, \$25 to \$35 for fair land, and \$8 to \$12 for pasture and other poor land. The average for tillable land should be about \$35 per acre.

The minimum capital for a settler is felt to be not less than \$2,500, and with this amount he must purchase desert land at wholesale prices (\$8 to \$12 per acre) and be given very liberal treatment by the local banks and implement dealers. If higher prices are to be paid for the land, the settler must either have an initial capital of from \$4,000 to \$6,000 or must be financed from Government or State sources at low interest rates and on long terms of repayment.

Much of the land under the Main Canal has a cover of stumps, brush, and trees, and an estimated period of 25 years will elapse before these lands are cleared and brought to full production. During this period the estimated gross annual production of this division varies from \$77,400 to \$174,560. The lands under the South Branch and North Branch Canals

should be settled and in full production within five years after water is available, and they are estimated to give annual gross returns of \$354,800.57 and \$1,298,938.33, respectively.

The cost of the project has been estimated at \$8,755,850.11. A repayment of 5 per cent of the gross annual income would return a total of \$2,236,760.62 during the first 25 years, with \$91,414.95 repaid annually thereafter. On this basis the project would repay the full cost of construction in 96.3 years.

The type of agriculture developed in this valley will attract a high quality settler and should result in the establishment of a permanent and substantial farm community. Homes will be available for between 450 and 500 families, and foodstuffs and feed with an annual value of over \$1,828,000 will be produced.

While the period of repayment is long, the project is permanent and safe from an agricultural standpoint, decidedly attractive from the viewpoint of health, educational, and social conditions, and is considered to be economically sound and feasible.

CHAS. F. SHAW,
Soil Technologist,
University of California.

B. E. HAYDEN,
Industrial Agent,
Bureau of Reclamation.

GEO. SEVERANCE,
Specialist in Farm Management,
College of Agriculture, Pullman, Wash.

LOCAL INDORSEMENT

ELLENSBURG, WASH.,
November 15, 1924.

DR. ELWOOD MEAD,
Commissioner, Bureau of Reclamation,
Washington, D. C.

DEAR SIR: The local committee appointed to review the report on the soil and economic conditions of the Kittitas unit of the Yakima project, prepared by Professor Shaw, Professor Severance, and Mr. B. E. Hayden, submit the following for your consideration:

We approve the report as a whole and wish to express our appreciation of the work done by the authors in collecting and compiling the data in the limited time at their disposal. The methods used are excellent and the results conservative. All computations are based on the provisions of the pending law, which provides for a repayment charge of 5 per cent of the gross annual production as determined by the Secretary of the Interior annually. It is obvious that any computation of repayment depends primarily on the interpretation of what is meant by "gross re-

ceipts," and lacking an exact definition of the term various values can be determined from the same data, depending on local opinion and customs. The committee must depend on the experience and practice in the Kittitas Valley.

In the discussion of the various items of the report, it is the purpose of the local committee to amplify the report from their local experience, with no thought of criticism or consideration of general policies outside of this particular unit of the Yakima project.

Location and established conditions.—Particular attention is called to the advantageous location of the Kittitas unit, which occupies the upper valley of the Yakima River just east of the Cascade Mountains, the center of the unit being but approximately 100 miles distant from Puget Sound, with exceptional transportation facilities. The elevation of the project varies from 1,500 to 2,200 feet above sea level.

The climate is moderate and healthful and is well suited to the production of agricultural crops and stock raising.

There is already developed a considerable portion of the valley, and the towns are well established. Nearly 60 per cent of the land included in the Kittitas reclamation district has been improved and is producing partial crops. Roads and schools have been built and are in use, and telephone lines reach all parts of the valley. Power and light lines serve a considerable portion of the rural population.

Educational and social conditions are excellent. In addition to the common schools, there are high schools at Kittitas, Ellensburg, Thorp, Cle Elum, and Roslyn, and at Ellensburg is located the State normal school, which has a large attendance. Churches and community centers are located at convenient points.

The financial conditions are exceptionally good and the present agricultural portions of the county prosperous. The farmers have all come through the period of agricultural depression in fine shape. This is shown in a striking manner by the report in the statements as to mortgages, bonded indebtedness, and taxes. Particular emphasis should be placed on the low bonded indebtedness of the county, especially as regards roads and schools. As a result of these conditions taxation is comparatively low. We believe this to be a most excellent showing.

Present irrigation development.—The irrigation development of the Kittitas Valley commenced in 1872, when the Manas-tash Canal was built to serve approximately 1,700 acres of land on the south

(Continued on page 20)

LOCAL COMMITTEE STRONGLY INDORSES THE PROJECT

Believes that the economic committee has been very conservative in their presentation of facts, and concurs in the statement that the project is economically sound and feasible

(Continued from page 19)

side. Since that time various other canals have been built, both from side streams and the Yakima River, and at present approximately 60,000 acres are under ditches. Of this land about 29,000 acres have a full water right and obtain their water from the Yakima River, and the remainder is irrigated from the side streams with only a partial water right. The Kittitas reclamation district only covers those lands which lie above the present river ditches.

Soil classification.—The basis of soil classification used in the report was a soil cruise made for assessment purposes, checked and extended by the authors of the report. In this classification classes 1, 2, and 3 are considered possible of full use for agricultural purposes, classes 4 and 5 are considered available for pasture, and class 6 as of no agricultural value.

The committee is of the opinion that the authors have been too conservative in their estimate as to the production that can be expected from the land classed as Nos. 4 and 5.

The graphical representation of the proportion of the different classes of land, as shown in the chart prepared by Professor Shaw, indicates very clearly that the greater part of the class 4 and class 5 land is distributed throughout the valley. Nearly every farm has a few acres of these classes,

and where the land is now cultivated it is difficult to distinguish the difference in crop production on the various classes.

Even on class 6 land, which is characterized as having no agricultural value, there are instances (shown to Mr. Hayden) of a production of 3 tons of alfalfa per acre annually. The data from which the percentage of crops grown under full water right was determined were compiled from a survey of 40 farms, nearly all of which contained some of the lower classes of land. Although the area of these inferior classes was contained in the total acreage and the percentage of crops determined on such total, the application of the table is only made on the three higher classes. If the proper credit was given to the area of lower class included, the subsequent computations would undoubtedly show higher production from all classes.

While there are instances of production from areas of class 6 land, as stated above, the committee concurs with the report that this class should be excluded and no provision made for the irrigation of same. This can be done very readily, as most of the class 6 land lies in relatively large bodies, especially in the vicinity of Reecer Creek, and is not scattered throughout the irrigable area.

The committee also concurs with the report in the statement that a careful soil survey should be made, with an accurate soil map showing the location and extent of every body of each soil in the area to be included.

Character of agriculture.—The report considers only the production of hay and grain, pasture, and a small area of miscellaneous crops. While it is evident that the greater portion of the land in the district will be devoted to these crops, it is also true that under the existing canals other crops are grown which constitute a substantial portion of the total production, and in all probability these crops will be grown in much the same proportion on the adjacent lands of the Kittitas reclamation district. Orchards on a commercial basis constitute at present about 2 per cent of the cultivated land of the valley having a full water right. Small fruits, potatoes, onions, corn, and garden products are grown generally and cover a considerable total area. One of the important sources of revenue is the sale of pasture on hay land after the crop is taken off. In the Kittitas Valley only two crops of hay are cut and the third crop pastured. Sale of this pasture brings from \$2 to \$10 per acre annually. Sale of straw after threshing the grain has also



A sample of the kind of oats grown in the Kittitas District, Yakima project, Wash.

been a steady source of revenue. We are of the opinion that a consideration of these items would materially shorten the estimated period of repayment.

Prices of products.—The committee is not yet certain as to the meaning of the term "gross receipts" as used for determining the amount of the annual construction repayments under the pending law. The natural assumption of the committee is that it would mean the total amount received by the farmers for all their products. In this locality the hauling of products to shipping point and the preparation of products into merchantable shape has always been considered a legitimate part of the cost of farm operations. As most of the hay and grain is shipped from the valley, this is always considered as hay baled and grain sacked f. o. b. shipping point. The authors of the report take a different viewpoint and endeavor to place a value at the farm. It is difficult to tell just where to make a division between farming and marketing operations, especially as applied to dairying, livestock raising, and the production of high-priced crops. Any estimate of returns will be affected by different assumptions and the repayments accordingly. This is mentioned as one of the problems which has confronted the committee in estimating the time of repayment. On our assumption a much shorter time will be required for complete repayment than that given in the report.

In considering the trend of the price of hay on the Pacific coast during recent years, the only authentic data available to the committee is the fact-finding report, which gives the average price of alfalfa on all reclamation projects from 1912 to 1922 as \$11.25 per ton and the average prices of those projects west of the Rocky Mountains as \$11.47 per ton. The prices given in the report as local prices are for the four years 1920 to 1923, inclusive, a period of general agricultural depression. The committee feels, therefore, that the authors are too conservative in their estimates of future prices.

Transportation and markets.—The Kittitas Valley has exceptional advantages, due to the proximity of Puget Sound transportation facilities, and available markets.

Two transcontinental railroads cut through the district, and shipping points will be in close proximity to all project lands. In addition, excellent highways, both State and county, reach to all portions of the irrigable land.

Due to the closeness to market and transportation facilities, the Kittitas Valley farmer has received more per unit for his produce than most of the farmers in other irrigated sections. With expand-

ing markets the advantage will undoubtedly increase.

Estimated repayments.—As set forth in the preceding paragraphs, the committee is of the opinion that the authors' estimate of the amount and time of repayments of the construction charge is very conservative and believes that the amount of annual gross production and annual repayments will be greater and the time of complete repayment shorter than is indicated by the report.

We believe and hope that future prices received for farm products will be more than have been obtained during the past four years, and we are confident that better production can be achieved with competent advice and sufficient water supply.

Amount already expended.—We wish to call attention to the fact that while the estimated cost upon which repayment is to be made is \$8,755,850, there has already been expended by the United States approximately \$1,794,427 in the construction of the reservoir system and storage works. On this amount no repayment can be expected until after the construction of the distribution system.

Cut-over land.—The report shows that there are 6,090 acres included in the irrigable area served by the Main Canal, and the authors estimate that a period of 15 years will elapse after repayments commence before this land is fully cleared and producing crops. This would be 20 years after water is available for irrigation.

The experience of the committee indicates that this land will be put into cultivation in a shorter period, as all lands now cleared in this area and large areas adjacent, especially the Teanaway district, were cleared and cultivated as quickly as water was available.

Sources of credit.—The possible sources of credit for the prospective settler as given in the report include the following:

1. Federal land banks.
2. Livestock corporations.
3. Local banks.
4. Insurance, mortgage companies, and private individuals.

The committee is of the opinion that, in addition to these, special attention should be called to the statement relative to the land settlement law of the State of Washington. It is believed that the provisions of this law furnish a very important source of possible credit for the settlers on the Kittitas unit.

Higher repayment rate.—The report has been prepared on the basis of the pending law, one of the chief provisions of which provides for the repayment of the construction costs at the rate of 5 per cent of the gross annual production. It is

the opinion of the committee that the Kittitas unit could very easily pay this, or even a higher rate of repayment without placing an undue burden on the water user.

Probably the best comparative data of the ability to make repayment is afforded by the records of the Cascade irrigation district, which lies adjacent to the lands to be served by the proposed North Branch Canal. Conditions generally and soil classification are practically the same in both areas. All classes of soil are assessed equally under the Cascade Canal and the amount per acre paid for water charges and interest for the past six years has averaged in excess of \$5 and for the years 1919 and 1920 was in excess of \$6. The Cascade district is in excellent financial condition, with bonds at the present time selling above par. There are few delinquencies, only \$10,787 in uncollected assessments outstanding for the current year according to the books of the secretary, and the secretary states that the treasurer has received the greater part of this amount, although it is not yet credited on the secretary's books. Since the district was formed there has been no land included sold for unpaid water assessments.

Conclusion.—The data and facts presented in the report are of much value and the authors are to be congratulated upon securing so much in so short a time. The committee wishes to be thoroughly understood that in the above discussion there is no thought of criticism, but it also feels that the authors are very conservative in their computation of results. We thoroughly concur in the statement of the authors of the report that—

"While the period of repayment is long, the investment is felt to be absolutely safe. The soils are good, and there is no probability that any serious unfavorable conditions may arise in the future. The crops grown are staples, in constant demand, insuring a permanent market. Irrigation and subdivision of these lands will provide between 450 and 500 farms, with an annual production of over \$1,828 worth of foodstuffs. The character of the agriculture and attractiveness of the region should bring in a high type of settler and should result in the establishment of a permanent and substantial farm community.

"In the light of these conditions, the project is considered to be economically sound and feasible and worthy of construction and development by the Government."

Respectfully submitted.

JOHN N. FAUST.
PHIL H. ADAMS.
A. L. B. DAVIES.
BRUCE BONNY.

TURKEY GROWING ON THE MINIDOKA PROJECT, IDAHO

E. B. Darlington, superintendent, tells about this growing industry which is helping to meet the demand for the holiday birds and is bringing ready cash to many progressive farmers on the project

ON the Minidoka project, Idaho, the past year was favorable for turkey raising, and that enterprise became an important part of the industry on many farms. As the birds developed in size they became conspicuous, and the large number and wide distribution of the flocks were manifest. It was not uncommon in driving over the project to come upon droves of several hundred, but the average farm flock was probably not over 50 turkeys.

D. L. Carlson, whose 40-acre farm is 5 miles northeast of Rupert, managed a flock of 700 bronze turkeys in 1924. About 625 of the holiday birds were hatched during the year, the remainder being old hens and gobblers. Mr. Carlson's forty is very well adapted to turkey growing, being in a territory of clean, sandy soil, with close access to free range, adjacent to running water in a large project lateral and yet not in the "subbing" district, where dampness might be detrimental to the health of the stock.

The Carlson turkeys did so well in 1924 that this grower is now planning to go into the business on a larger scale. He believes that on 80 acres along the project boundary, where the birds can be ranged on unentered public land, he can successfully raise at least 1,000 turkeys. This number in his estimation would justify the employment of a herder, who could drive the flock to and from the range and devote his entire attention to the care of the birds.

In summer the turkeys require very little feeding, their diet consisting largely of weed seeds, green feed, grasshoppers, and other insects. However, Mr. Carlson last year fed some wheat throughout the summer to keep the flock in good tone. As the holiday season approached and fattening became desirable, a mixed ration of corn, cooked potatoes, and wheat was fed. The potatoes were boiled in a home-made cooker improvised from old oil barrels, and the birds were permitted to peck at this cooked food whenever hungry. They ate it with apparent relish. Shell, grit, and charcoal were made available at all times.

Sitting hens were kept in individual pens, each turkey hen covering about 18 eggs. The nests were on the ground, but the pens were so arranged that the hens while sitting could be protected from the sun and from disturbance by the other turkeys. On the Carlson farm 50 hens were set and about 625 young birds brought to maturity. It is therefore apparent that the ratio of grown stock to eggs set was close to 70 per cent.

Another large flock of turkeys was raised by Mr. and Mrs. A. W. Posey on an 80-acre farm 2 miles south of Springdale in the South Side pumping division. The Poseys brought about 500 turkeys through the season out of 1,050 eggs hatched. Heavy losses occurred on account of coyotes, theft, and road traffic. The Posey farm is bounded on two sides by graveled highways and automobile

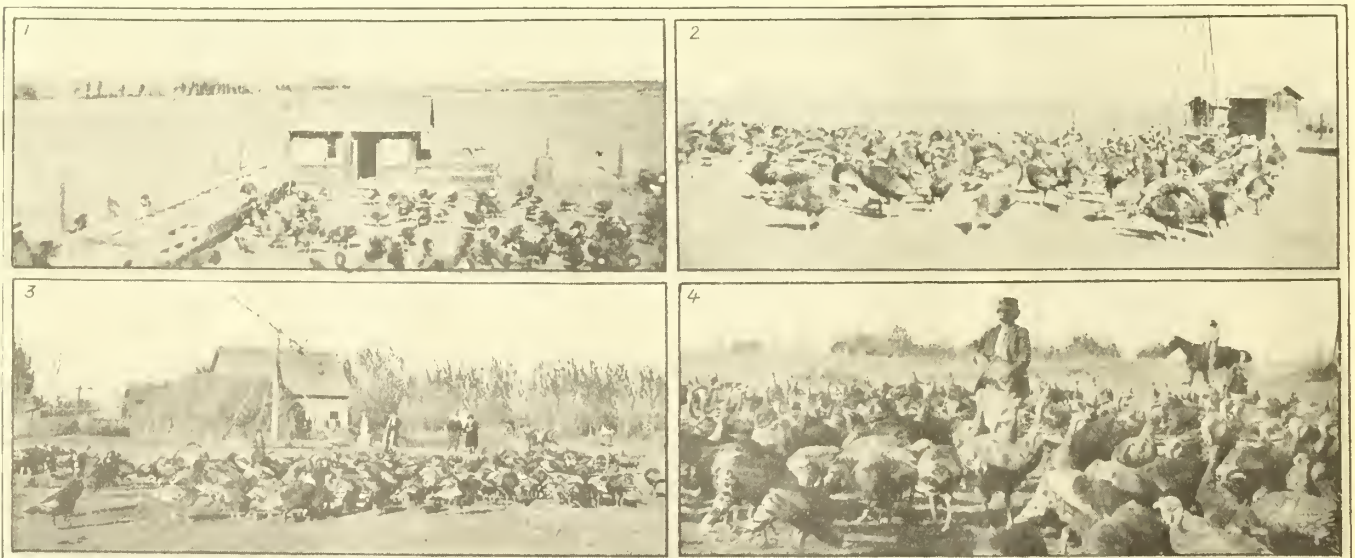
traffic is quite heavy. A considerable number of the poults were killed by passing cars, and several matured turkeys were run over by careless drivers.

Mrs. Posey set 98 hens. Their nests were made on the ground and no pens were used, but the hens were separated by wire netting. Many of the nests were stolen, but whenever possible to find the hidden clutch the eggs were gathered and the hen provided with a setting in a protected place where care could be given her.

The young turkeys were fed cottage cheese, mixed with a little black pepper; hard-boiled eggs, shells and all; and some grain. At fattening time sugar beets were cut up and fed with corn and wheat. The mature turkeys were not fed during the summer, but were allowed to roam at will. Mrs. Posey believes that the damage the birds do to growing crops is more than offset by their destruction of insect pests. The foraging turkeys keep down bugs of all kinds. She states that the alfalfa crop on their farm was better this year than ever before and attributes the improvement in large part to prevention by the turkeys of injury through the ravages of weevil and grasshoppers.

At evening the turkeys were brought into the farmyard and went to roost upon a large open-air rack made of poles. When the flock of 500 turkeys was banked upon the roost for the night, it was a sight frequently remarked upon by people driving by. The birds seemed not to suffer

(Continued on page 23)



1. Individual pens for sitting hens, Carlson ranch. 2. Sandy feeding ground, Carlson ranch. 3. Feeding the flock, Posey ranch. 4. Mrs. Posey with her flock

DR. MEAD RECEIVES NEW HONORS

DR. ELWOOD MEAD, Commissioner of the Bureau of Reclamation, has received a commission from the President designating him a special commissioner on the part of the United States to cooperate with representatives of Mexico in a study of the equitable use of the Rio Grande below Fort Quitman, Tex. At the request of the President, Doctor Mead will act as chairman of the commission. The letter from the Secretary of State designating Doctor Mead follows:

DEPARTMENT OF STATE,
Washington, January 6, 1925.

ELWOOD MEAD, Esquire,
Commissioner, Bureau of Reclamation,
Department of Interior,
Washington, D. C.

SIR: I take pleasure in enclosing the commission of the President designating you a special commissioner on the part of the United States to cooperate with the representatives of the United Mexican States in a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Tex. The President has also designated Mr. W. E. Anderson, of La Feria, Tex., and Gen. Lansing H. Beach, United States Army, retired, as members of the commission. It is the wish of the President that you shall act as chairman.

There is also enclosed for your information a copy of the act approved May 13, 1924, providing for the creation of the commission.

The American Embassy at Mexico City

MINIDOKA TURKEYS

(Continued from page 22)

from the exposure even during the period of bitterly cold weather in December, when a subzero temperature of -28° F. was reached.

The Poseys sold nearly 400 of their birds for holiday shipment, receiving an average of 21 cents per pound live weight on 4,500 pounds of turkey. They retained 100 hens as a nucleus for next year's flock. A few were sold locally.

It is estimated that 10,000 dressed turkeys had been sold off the project by New Year's Day in addition to the local consumption. Three full carloads were shipped, together with several broken consignments. An average of 28 cents per pound was received. The early shipments went to Chicago and farther east, but later in the season this project's turkeys were largely absorbed by California markets. The demand for Minidoka poultry is not restricted to the holiday season, and many orders for Minidoka project turkeys are filled after the holidays are over. Many people prefer the later birds because in general they are in better condition.

has been instructed by telegraph to ascertain when and where it will be possible for the Mexican representatives to meet your commission. The department will acquaint you with the substance of the embassy's reply as soon as it shall have been received, and a further communication will be addressed to you in due course as to the date on which you will assume your duties.

A similar letter has been sent to Messrs. Anderson and Beach.

I am, sir, your obedient servant,
CHARLES E. HUGHES.

THE ACT

The act referred to is as follows:

An act providing for a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, in cooperation with the United States of Mexico.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President is hereby authorized to designate three special commissioners to cooperate with representatives of the United States of Mexico in a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, with a view to their proper utilization for irrigation and other beneficial uses. One of the commissioners so appointed shall be an engineer experienced in such work. Upon completion of such study the results shall be reported to Congress.

Sec. 2. The sum of \$20,000 is hereby authorized to be appropriated out of any moneys in the Treasury not otherwise appropriated for carrying out the provisions hereof.

Approved, May 13, 1924.

CALVIN COOLIDGE,

President of the United States of America.

To all who shall see these Presents, Greeting:

KNOW YE, That reposing special trust and confidence in the Integrity and Ability of Elwood Mead, of California, I hereby designate him a Special Commissioner on the part of the United States of America to cooperate with representatives of the United States of Mexico in a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, and do authorize and empower him to execute and fulfill the duties of this commission, with all the powers, privileges and emoluments thereunto of right appertaining during the pleasure of the President of the United States.

IN WITNESS WHEREOF, I have caused the Seal of the United States to be hereunto affixed.

DONE at the City of Washington, this
twenty-seventh day of December,
in the year of our Lord one
thousand nine hundred and
twenty-four, and of the Independence of the United States
of America the one hundred and
forty-ninth.

By the President:

Charles E. Hughes
Secretary of State.

DENVER CONFERENCE TO HAVE FAR-REACHING RESULTS

Delegates from virtually all the irrigation projects of the Bureau of Reclamation meet in harmonious session for discussion of the new reclamation law and formulation of constructive resolutions

“A NEW and better day has come to Federal Reclamation,” said one of the delegates to the Denver Conference on Reclamation. This statement expressed the sentiment of all the delegates. Everybody was looking forward. The difficulties of the past were referred to only as lessons for the future. Confidence in the management of the Bureau of Reclamation, in the feasibility of the new reclamation law, and in the willing cooperation of the water users was freely expressed. Constructive suggestions were made from the beginning to the end of the conference. The new law was analyzed in terms of project experience and was found good. The resolutions adopted by the delegates will be useful in working out the problems of Federal Reclamation. Seldom, if ever before, has so helpful a gathering of Federal water users been held.

The conference convened upon call of Dr. Elwood Mead, Commissioner of Reclamation. The delegates were called to order at 10 a. m. January 6, 1925, by Acting Chief Engineer R. F. Walter, as pressing duties in Washington, where Congress was in session, made it impossible for the commissioner to be present. Gov. Thomas E. Campbell, chairman of the “Fact Finding Commission,” acted

as permanent chairman, and Dr. John A. Widtsoe served as secretary.

The keynote of the conference was sounded by Dr. Elwood Mead in a letter addressed to the conference, elsewhere published in this issue. The following telegram was received from the Secretary of the Interior, Dr. Hubert Work:

WASHINGTON, D. C.,
January 5, 1925.

HON. THOMAS E. CAMPBELL
*Care Reclamation Bureau,
Wilde Building, Denver, Colo.:*

Please for me extend to the Denver Conference on Reclamation my congratulations and best wishes for successful meeting. It promises cooperation with the department necessary to the success of the new policy intended to reclaim reclamation to those for whom it was originally intended, for those who have settled and developed the land, for a sound and equitable financial policy to secure ultimate refund to the Government of its investment in reclamation less construction charges, if any, which may have been inequitably laid against projects. Suggestions and proposals for the effective administration of the new reclamation law are invited and will be carefully considered. Cooperation by the water users with the forthcoming appraisers of projects will be appreciated. I am hopeful that local responsibility in the operation and maintenance of projects

may be promptly assured, that all projects may be operated by those who live on them and for whom they were constructed.

HUBERT WORK.

The communications from Secretary Work and Commissioner Mead received hearty response from the delegates.

The attendance from the projects was made up almost entirely of accredited delegates from recognized project organizations of water users. Only five delegates failed to present satisfactory credentials. Consequently it was an official gathering, possessing authority to speak for the projects. Twenty-one projects were represented, and communications were received from the others, explaining their nonrepresentation. A number of visitors were also present. The Bureau of Reclamation and the Department of Agriculture had several representatives present. Governor D. W. Davis, Director of Finance; Geo. C. Kreutzer, Director of Reclamation Economics; and Acting Chief Engineer R. F. Walter represented their respective divisions in the bureau and took vigorous parts in the discussions. The attendance as registered follows:

REPRESENTATIVES OF PROJECTS

Belle Fourche project.—W. D. Buchholz.



Delegates to the Reclamation

Boise project.—Fred Harrington, H. A. Griffith, and L. J. Magee, representing one board of directors of the Boise-Payette Water Users' Association.

T. W. Tarr and Walter Griffith, representing another board of directors of the Boise-Payette Water Users' Association. Chas. G. Allen, representing the Hillcrest Extension.

G. A. Remington and H. L. Randall, representing the Nampa-Meridian irrigation district.

Edward Smith and W. H. Thompson, representing the New York Canal Co.

John C. Rice, representing the Black Canyon, Pioneer, and Emmett irrigation districts.

W. B. Mitchell, representing the Farmers' Cooperative Ditch.

David Kennedy, representing the Dry Lake section.

Grand Valley project.—D. W. Aupperle; C. J. McCormick, representing the Orchard Mesa district.

Huntley project.—A. L. Makinson, representing the Prior Division. O. P. Pessman, representing the eastern division.

King Hill project.—F. L. Kinkade and Charles Stout, representing the King Hill irrigation district.

Klamath project.—A. L. Wishard.

Lower Yellowstone project.—Burton Adams, representing the Lower Yellowstone irrigation districts Nos. 1 and 2.

Minidoka project.—W. C. Paul and R. L. Willis, representing the Gravity Division.

W. L. Manning and George Durfee, representing the South Side irrigation district.

Newlands project.—Roy W. Stoddard representing the Truckee-Carson irrigation district.

North Platte project.—C. W. Scoville, representing the Interstate Division.

Jas. T. Whitehead, Wm. Morrow, and Chas. Kearney, representing the North Platte Water Users' Association.

Mark Spensville, C. H. Silvernail, and R. H. Willis, representing the Northport Division.

A. M. Mathers, representing the Gering-Fort Laramie irrigation district.

R. F. Tebbet and P. T. Lehmer, representing the Goshen irrigation district.

Okanogan project.—John S. Peterson, R. C. Rasmussen, B. E. Hendrick, and E. D. Clough, representing the Okanogan irrigation district.

Rio Grande project.—J. W. Taylor, representing the Elephant Butte irrigation district.

Roland Harwell, representing the El Paso Water improvement district.

Riverton project.—O. M. Gibson, representing the Midvale irrigation district.

Walter Warren, Midvale district.

Shoshone project.—C. M. Davis, representing the Frannie division.

Earl Murray, representing the Garland division.

N. A. Nelson.

Strawberry Valley project.—K. F. Keeler, Lars P. Larson, A. R. Creer, D. P. Brinton, and Lee R. Taylor.

Sun River project.—G. A. Conrad, representing the Fort Shaw division.

Umatilla project.—K. F. McNaught, representing the Hermiston irrigation district.

C. E. Glasgow, representing the West Extension irrigation district.

Uncompahgre project.—Frank Meaker, William P. Dale, Charles J. Moynihan, Frank D. Catlin, F. E. Spencer, and John J. Tobin.

Yakima project.—F. E. Fyfe, E. C. Houston, and W. L. Barker, representing the Sunnyside Valley irrigation district. Mr. Barker also represented the Outlook pumping plant.

B. Hixson, representing the Grandview pumping plant irrigation district.

Stephen J. Harrison, representing the Sunnyside (Benton) irrigation district.

C. P. Wickersham and W. E. Thompson, representing the Tieton division.

A. B. Delp, representing the Snipes Mountain irrigation district.

Great Salt Lake Basin project.—Lloyd Garrison, state engineer; Joseph Murdock, Southern division; W. O. Creer, J. W. Alleman, J. B. Tucker, and E. L. Burdon.

Williston project.—Burton Adams.

George A. Fisher, Strawberry Valley Grazing Co.

A. C. Cooley, in charge agricultural demonstrations on reclamation projects, Bureau of Plant Industry, United States Department of Agriculture.

(Continued on page 26)



DELEGATES DISCUSS PROVISIONS OF NEW LEGISLATION

The act is taken up section by section for extended and constructive consideration by the delegates, culminating in the adoption of a number of resolutions

(Continued from page 25)

R. P. Teele, Census Bureau.

A. L. Fellows, Department of Agriculture.

R. L. Parshall, Colorado State Agricultural College.

Bureau of Reclamation.—D. W. Davis, director of finance; R. F. Walter, acting chief engineer; George C. Kreutzer, director of reclamation economics; Andrew Weiss, assistant director of reclamation economics; B. E. Stoutemyer, district counsel, Boise; J. R. Alexander, district counsel, Montrose, Colo.; R. M. Patrick, district counsel, Denver; Armand Offutt, district counsel, Denver; J. B. Bond, superintendent, Boise, Idaho; L. H. Mitchell, superintendent, Powell, Wyo.; L. J. Foster, superintendent, Montrose, Colo.; William S. Arthur, superintendent, Williston, N. Dak.; C. A. Lyman, repayment accountant, Denver; J. R. Ummel, chief clerk, Denver; W. A. Meyer, fiscal inspector.

The conference continued until Saturday. Late Thursday afternoon the delegates from the projects took charge of the meeting to formulate their resolutions, while Governor Campbell, Doctor Widtsoe, and bureau representatives met with the various project delegations to discuss matters not of interest to the whole conference.

The purpose of the conference had been tersely stated by Commissioner Mead in the official call:

The purpose of this conference is to consider the matters that are to be dealt with in determining the readjustment of project costs and the relation of the projects to the Government under the provisions of H. R. 9559, recently passed by Congress. Among the matters to be dealt with are:

(a) Number of zones and basis of classification of land to secure, as near as may be, equality of conditions in the payment of project costs on the basis of 5 per cent of the crop returns.

(b) To determine the acreage of land now included in the project that ought to be excluded and relieved from all obligations to pay project costs.

(c) The willingness or unwillingness of the water users to organize a district and as a district to take over the management and control of the project as provided for in subsection G of section 5, of the above-mentioned act.

(d) Any other matters which the water users may desire to bring up for consideration at the conference.

DISCUSSION OF THE ACT

The conference, therefore, considered section by section, the new reclamation act (H. R. 9559) passed by Congress last December.

It was the consensus of opinion that the provisions of the act relating to new projects will safeguard the water users on such new projects against most of the difficulties that have attended the settlers on the older projects. Especially did the conference agree that a careful and exhaustive study should be made of the possibilities of any proposed project before authority to construct it is requested. The section providing for two public notices was also looked upon with favor.

The first discussion of the sections dealing with existing projects, centered upon subsection F, which provides that hereafter all project construction charges shall be made payable in annual installments of 5 per cent of the average gross annual acre income. With only two exceptions the projects declared that the new method of repayment would be beneficial to the water user. Some misunderstanding existed as to the method of determining the basis upon which the charges are to be made. This led to an exhaustive discussion of methods of classifying project lands on the basis of productivity. The land-classification methods employed by the North Platte project, and more recently on the Shoshone project, were considered in detail, and the conference concluded that a land classification using essentially the methods followed on these projects would be acceptable to all the projects for the purpose of establishing a basis for the annual repayments under the new law.

It was also made clear that the basis upon which any individual farmer is to make his repayments under the new law is that of the zone, division, or class to which his lands belong, and that no attempt will be made to maintain individual crop production accounts for this purpose. The discussion made clear that water users, specializing in intensive crops, would not have to bear an unduly heavy annual construction charge, since their production record would be averaged with all the production records of the same class of lands. The delegates expressed the opinion that even under the new law the period of deferment as provided, would have to be asked for by many projects.

Much discussion resulted from the reading of subsection G, which provides that if a project, two-thirds of which is covered by water-right contracts, is to benefit under the new repayment law, the

management of the project must be taken over by a legally organized water users' association or irrigation district. An almost unanimous desire was expressed by the water users to take over the management of their projects. It seemed to be the sense of the conference, by a motion which does not appear in the final resolutions, that there is no objection to a joint liability clause in any contract turning over the projects to the water users, providing that any water user who completes his payments may, upon such completion, receive title to his land and water without further liability for the water users who have not yet paid out. In view of the fact that a number of provisional contracts have been formulated for the taking over of projects by water users, this subject received lengthy consideration by the conference.

There was a sharp division of opinion regarding the form of organization. Several projects were convinced that the irrigation district form of government was feasible and satisfactory, and these projects expressed themselves as ready to take over the project management under the district irrigation laws of their respective States. Other projects declared that because of peculiarities of the district laws of their States, or because of local conditions which could not well be changed, the irrigation district form of government seemed infeasible and well-nigh impossible. These latter projects proposed an association form of government, the association to be a corporation under State law, recognizing the joint liability of the water users and proposing ample security to cover the obligations due the Government. The conference finally decided that in its opinion the form of project management should be left optional with the projects, but remained silent as to the principle of joint liability. Undoubtedly, the discussions of the conference indicated that the water users are eager to take over the management of the projects and are ready to cooperate with the Government to the fullest extent in working out contracts that will fully protect the Government and at the same time give the water users the greatest opportunity to manage the projects successfully.

Subsection I provides that when the water users take over the care, operation, and maintenance of a project the total accumulated net profits of various kinds

shall be credited to the construction account of the project. In this connection the question was raised as to the possibility, after a contract for management had been entered into with the Government, of using the annual revenues to meet the annual construction and operation and maintenance charges. It was the unanimous opinion that the law could be so construed as to make this possible, and that since on many projects there is a considerable income from power plants, grazing lands, etc., this plan, might be of considerable assistance in achieving project success.

Subsection K also was given extended and constructive discussion. This subsection provides that the Secretary of the Interior shall have authority to undertake a comprehensive and detailed survey of the projects for the purpose of determining whether the inability of settlers to repay construction costs is due to lack of soil fertility, inadequate water supply, other physical causes, or errors or mistakes and that upon the basis of such surveys and report to Congress, authority may be obtained for charging off certain amounts now included in the construction costs to be repaid by the water users. It was agreed by all the speakers that in the classification of project lands the last class might well be the one that should either be charged off permanently as not within the possibility of reclamation or held in suspension until such time as new methods of agriculture or remedial measures had brought the lands in question within the possibility of reclamation. With respect to the question of inadequate water supply, a number of definitions of an adequate water supply were offered by the delegates. All of these were interesting, many of them novel, and some of them contributions to the terminology of irrigation practice. It would seem to be the general opinion that whenever a crop received so much water that it did not appear to the eye of the experienced farmer to be suffering for water, it was receiving an adequate supply. Others, however, voiced the opinion that a water supply is adequate only when it permits a maximum production of crops, even though the increase in yield be slight as compared with the large volume of water necessary. Meanwhile it was agreed that, except on a few projects, water shortage is not a disturbing factor in Federal reclamation.

The probable errors or mistakes that may have been made in the construction, operation, and maintenance of the projects were not discussed, as it seemed to the conference that such matters vary with the different projects and can best be dealt with when the appraisal committees

visit the projects. It was urged that the surveys contemplated in subsection K be undertaken without delay, that reports based upon them be transmitted to Congress at the earliest possible date, and that prompt steps be taken to obtain congressional action on them. In fact, several speakers gave it as their opinion that little could be done to take over the projects by the water users, and therefore to secure the benefits of the new repayment law, until after these surveys had been made, reported to, and acted upon by Congress.

RESULTING RESOLUTIONS

The resolutions as formulated by the official delegates from the projects include, in essence, the views of the delegates relative to the operation of the new law.

At a meeting of the reclamation representatives Thursday afternoon a splendid spirit of cooperation with the Federal Government officials was shown, and confidence expressed in the final working out of the relief measures by the Secretary of the Interior that will place irrigation projects in a more prosperous condition and assure to the water users that our Federal Government recognizes the co-partnership that really exists. The following representatives were named on the resolution committee:

W. L. Barker, Yakima project, Washington.

W. D. Buchholz, Belle Fourche project, South Dakota.

James T. Whitehead, North Platte project, Nebraska-Wyoming.

Karl F. Keeler, Strawberry Valley project, Utah.

L. J. Magee, Boise project, Idaho.

Roland Harwell, Rio Grande project, Texas.

Charles Moynihan, Uncompahgre project, Colorado.

Lee R. Taylor, president of the Federated Water Users Association, presided at the night meeting, and all resolutions presented by the committee were unanimously adopted.

W. L. Barker, president of the Sunnyside Valley irrigation district, Yakima, Wash., was chairman of the resolution committee and Charles Moynihan, of the Uncompahgre project, was secretary.

General expression was voiced toward Governor Campbell, Governor Davis, Dr. John A. Widtsoe, and Director G. C. Kreutzer for the able, fair, and helpful manner in which the conference was conducted. The resolutions follow:

Whereas very unfavorable financial conditions exist on many of the irrigation projects constructed by the United States, and to relieve these conditions and to

place them on a more substantial basis the Hon. Hubert Work, the Secretary of the Interior, appointed the Fact Finding Commission and subsequently appointed from this commission Hon. Elwood Mead as Commissioner of Reclamation;

Whereas conditions on these projects are such that it is imperative that they obtain all the relief provided by the fact finders' bill, which became a Federal law on December 5, 1924, without unreasonable delay, and the Secretary of the Interior realizing these conditions and the necessity for quick action has now proposed appraisal committees represented by Governor Campbell and Doctor Widtsoe, who are now in session in this city to aid the several projects in applying the terms of said relief law: Therefore, be it

Resolved, That we, the representatives of the projects assembled in the city of Denver, Colo., do hereby express our sincere appreciation to Secretary Work, to Commissioner Mead, and to the members of the Fact Finding Commission for their efforts in our behalf, realizing that they have made the fact finders' relief bill possible, and that we are willing to support and cooperate with the Secretary of the Interior to the fullest extent in his efforts to bring about more favorable conditions on the projects;

That each project be allowed to make its own choice as between a water users' association and irrigation district;

That in the event the water users elect to take over maintenance and operation of a project as a precedent to securing the benefits of the act of reclamation of December 5 the water users be granted the privilege of accepting any desired benefits to the exclusion of all other benefits;

That subsection G of the adjustment act should be modified by new legislation to the end that, on projects where the physical conditions of the irrigation works are such that there is reasonable apprehension as to their permanence and where there is reason to believe that further heavy construction expenditure will be necessary, the taking over of the operation and maintenance be not required as a precedent to receiving the benefits of this act;

That the scope of the review board in connection with the adjustment act should be broadened to include the investigation of serious physical factors in the future success of the projects, and the making of recommendations thereon as to remedial action that may be found advisable;

That in determining the per acre value of crops an appraisal board be appointed on each project or division of a project. The appraisal board shall consist of three members to be appointed by the water users' organization and two members to be appointed by the Reclamation Bureau. This board shall adopt rules for fixing values and determining the yield of the different crops, which rules shall be approved by the Secretary of the Interior;

That we believe the adjustment act of December 5, 1924, provides for individual acreage liability, and that when the construction charge on the given acre is fixed by the Secretary of the Interior and thereafter fully paid such acre shall be released from further liability for project construction charge. In this connection we respectfully call attention to the original

(Continued on page 28)

THE DENVER CONFERENCE

(Continued from page 27)

wording of H. R. 8836, page 6, line 21, as submitted by the Fact Finding Commission, for comparison with the wording in subsection F of the act as amended and passed by Congress; also that a similar comparison be made between the language of line 19, page 9, of H. R. 8836, and the language of subsection L of the act as passed;

That in administrating the act of December 5, 1924, we respectfully request that it be interpreted and construed most liberally and favorably to the settlers under reclamation projects, to the end that they may be placed in a position to make their project payments without need of further adjustment, and that all benefits thereunder be extended equally to water users' associations or irrigation districts;

That where legal water users' organizations are ready and desirous of taking over the care, operation, and maintenance of project works the same be transferred to them at once, so that they may assume control for the season of 1925;

That we respectfully invite this Adjustment Commission to visit each reclamation project at its earliest convenience;

That in our opinion it should be the policy of the Reclamation Bureau to grant a three-year moratorium on construction cost payments upon application and proper showing by any reclamation project;

That all delinquent charges and penalties existing at the time of the execution of any amended contract be added in each case to the total obligation of the water users, and the new total thus established then be the construction charge against the land in question;

That the lands of each project be classified in substantial accordance with the pattern rules, a copy of which is attached hereto. For this purpose there shall be appointed a classification board of five members, three of whom shall be appointed by the irrigation districts or water users' associations, and two members by the Bureau of Reclamation. This board shall employ one or more competent persons to do the classifying of the lands of the project under their direction;

That past crop returns be subject to review and modification;

That future crop returns be taken and prices fixed according to rules to be agreed upon by water users of each project, and the Secretary of the Interior.

Whereas entrymen on Government irrigation projects are not required to make proof of reclamation and qualify for patent at time of making proof of residence and cultivation, and under some project conditions for many years thereafter; and

Whereas on such projects, district organizations making assessments find in such cases enforcement of same impossible, and

Whereas the Government has a guarantee of repayments from the districts under contracts without withholding patents: Now therefore be it

Resolved, That we recommend that the Federal laws be amended to require issuance of patents after proof of residence and cultivation on projects having contracts for repayments: Be it further

Resolved, That it is the sense of this meeting that the regulations which are to be prescribed by the Secretary of the Interior relating to the supervision of projects, the control of which has been tendered to the water users under the act of December 5, be along the general lines of those set forth in the contract between the United States and the Salt River Valley Water Users' Association, to the end that the water users may manage their affairs in a business-like manner without further restrictions than those imposed in this tried contract, where the success of the operation thereunder has been demonstrated, and that the charges incident to this supervision be limited to the cost of the actual services rendered and be not based upon a flat charge or a percentage of the construction cost.

W. L. BARKER, *Chairman,*
ROLAND HARWELL,
W. D. BUCHHOLZ,
JAMES T. WHITEHEAD,
KARL F. KEELER,
L. J. MAGEE,

CHARLES MOYNIHAN, *Secretary,*
Resolution Committee.

ADJUSTMENT ADVISERS COME TO WASHINGTON

Following the conference in Denver of project representatives, covered in detail in another part of this issue. Gov. Thomas E. Campbell and Dr. John A. Widtsoe, adjustment advisers of the southern and northern divisions, respectively, constituted chairmen of the Board of Survey and Adjustments; George C. Kreutzer, director of reclamation economics; Andrew Weiss, assistant director of reclamation economics; and B. E. Stoutemyer, district counsel, come to the Washington office to discuss with Commissioner Mead the organization of the project reappraisal work and other matters in connection with the interpretation and application of the new reclamation law.

American agriculture is in the best position it has held since 1920. Prices of many crops are at the highest point in four years, and costs of production have declined from the high point of the depression period.

The success of cooperative marketing depends more than anything else upon efficient management and a thorough understanding on the part of the membership as to the possibilities and limitations of cooperative marketing.

RELIEF TO SETTLERS MUST BE SAFEGUARDED

The Bureau of Reclamation is not a credit agency, like the War Finance Corporation, or the Federal Land Bank, and it would appear that these are the sources that settlers should look to for the refunding of pressing private obligations and for obtaining money on longer time and more favorable interest rates. Any attempt to have the Bureau of Reclamation function as such a credit agency, and to sanction the postponement of payments for its services in order that the principal and interest of other debts might be paid, will hopelessly demoralize its finances and so discredit its operation as to endanger the whole reclamation policy. There is imminent danger of this, and adjustments should, therefore, be restricted to the sphere in which relief can legally be extended, and where conditions on the projects justify such extension.

There is no authority under the relief act of May 9, 1924, to grant extension of operation and maintenance charges for 1924, and the moratorium of three years authorized by subsection F of the fact finders' law is contingent upon operation and maintenance of constructed works being taken over by the water users according to the provisions of subsection G of this law. From this it follows that there can be no general moratorium under the present law until there are executed appropriate contracts for adjustment, which can only be made properly and safely after comprehensive surveys have been completed and essential data assembled and studied by the board which will visit the projects for this purpose.

BOX OF YAKIMA APPLES BRINGS GROWER \$1.18

A box of extra fancy Winesap apples produced in Washington State and sold for \$5 by a grocery store owned by an individual in New York City, returned a gross profit of \$1.18 to the grower and \$1.87 to the retailer. It was assumed that the apples were shipped by a producer-owned organization and reached the consumer through a wholesaler, jobber, and retailer. The grower's gross profit represented 23.6 per cent of the retail price and the retailer's share was 37.4 per cent. The jobber operated on a 49-cent margin per box and the wholesaler 39 cents, or 9.8 per cent and 7.8 per cent respectively. The transportation charges were 80 cents, or 16 per cent, and the margin of the shipping organization was 27 cents, or 5.4 per cent.

COMPLETENESS OF EFFORT

THE caption to this article is a phrase with a wealth of meaning, and is the ideal toward which the employees as a unit, of the Bureau of Reclamation should work. Perhaps some of us sometimes do a job of work that on the face of it is satisfactory and will pass close inspection; but does it represent in full the idea contained in the words "completeness of effort?" This idea is exemplified to a high degree in the fine relationship existing between the employees, of the Rio Grande project and the water users, which might well be emulated on other projects of the bureau. The following letters bring out this idea so forcefully that they are quoted with a view to calling to the attention of all the projects, and incidentally the water users, the possibilities that lie in a genuine spirit of completeness of effort and cooperation on the part of all members of the reclamation family.

THE LETTERS

ELEPHANT BUTTE IRRIGATION
DISTRICT OF NEW MEXICO,
Las Cruces, N. M., December 15, 1924.
DR. ELWOOD MEAD,
Commissioner,
Bureau of Reclamation,
Washington, D. C.

DEAR DR. MEAD: We have, on several occasions, taken the liberty of writing you on the importance of better relationships between settlers' organizations and bureau officials in furthering the solution of the problem of making reclamation a success. It has been our belief that, in the history of this project, this factor has been of perhaps equal importance to the factors of strikingly high grade engineering and excellent organization of the project forces.

We believe in centralized authority under an engineering head, and have suggested to you as a possible progressive step in the bettering of conditions on the more backward projects, the introduction of methods calculated to secure better relationships. The theoretical value of such policies, we believe, is unquestioned, but the details of putting them into operation under particular circumstances are, no doubt, quite baffling. It has been our experience that direct contacts formed by project managers, although extremely valuable in arousing community leaders to their responsibilities in regard to this relationship, bring results but slowly because no leaders can advance much ahead of the great force of public opinion, which, on reclamation projects is influenced to a very great degree by the particular contacts that the individual farmers have with various field men of the service.

The recognition of this situation by our local project office, and the appropriate

handling of it, explain partially the local success.

I am enclosing herewith copies of recent letters which have passed between the district and the project office, which throw some light on detailed methods of gaining this elusive better relationship. The particular significance of incidents such as are referred to lies in their proven effectiveness under our local conditions.

Feeling that you might be interested in these trivial indications of the water users' attitude, and that you might appreciate the receipt of occasional letters of favorable comment, we are

Very truly yours,

ELEPHANT BUTTE IRRIGATION
DISTRICT.

J. W. TAYLOR,
President and Manager.

EL PASO, TEX., December 11, 1924.
From: Superintendent.
To: Assistant Engineers Bushman,
Brown, and Kerr.
Subject: Construction results—Rio
Grande project.

1. Construction work yet remaining to be accomplished in the Rincon, Mesilla, and El Paso Valleys is largely extensions to the lateral and drainage systems. Practically all of the large principal structures and works have been completed. The building of the smaller works, consisting of small canals and structures and setting of farms turnouts is a subject of probably more intimate interest to the land owner than the more remote principal structures. These smaller structures and distributaries directly affect the land owner's farm layout and his operations.

2. This class of work calls for direct contact between the employees of the Bureau of Reclamation and the water users, and the service rendered forms, to a large extent, the basis of the opinion of the entire operations of the bureau.

3. From personal inspection, cost reports, and information reaching the

project office concerning the project work, I am much gratified at the character of results which are now being obtained by you in accomplishing the construction program.

4. It has been noted that the policy so desired by the project office of completeness of effort has been well carried out. I have been assured by many of the land owners whose property has been affected by recent canal and other work that they appreciate the fine spirit of cooperation, the effectiveness of the work, and its reasonable cost.

5. I am writing this to you to express my appreciation and acknowledgment of your efforts to not only produce effective works at low cost, but to effect a feeling of satisfaction on the part of the land owners who are paying the bill that the work has been well done and has taken his interest into consideration. The work of the construction force now furnishes an answer to the question of "How can these works which benefit the water users be built without antagonizing them."

L. M. LAWSON.

DECEMBER 15, 1924.

L. M. LAWSON,
Superintendent, Bureau of Reclamation,
El Paso, Tex.

DEAR MR. LAWSON: It was a great pleasure to receive a copy of your letter of December 11 to Assistant Engineers Bushman, Brown, and Kerr on the subject of the construction results of the Rio Grande project, and to note the emphasis you placed therein on the fine spirit of cooperation which your force has exhibited during the past year.

You have very properly called their attention to the fact that this spirit has been generally noted by water users, and this office desires to express appreciation of your remarks. Not a week goes by that we do not hear favorable comment on your engineering staff, and it is quite noticeable that the number of criticisms and complaints is steadily diminishing. The true effect of this general appreciation of the bureau's services is quite apparent on the amount of work required by this office in investigating complaints.

The indirect effect we feel is of even greater value to us in that there is a growing feeling of the mutuality of the responsibility for success or failure of reclamation that is being properly shared between the bureau and the settlers. We are thus overcoming one of the most baffling problems of reclamation, that of learning to operate successfully and at the same time preparing the settlers' organizations to take over the projects under conditions of effective operation, with an awakened public opinion, believing that local self-government of the people, for the people, and by the people is an assured success. We have for a long time realized that this was your goal. Its practical accomplishment speaks volumes for you and your loyal and efficient employees, and should point the way wherein the less fortunate projects may find success.

Cordially yours,

ELEPHANT BUTTE IRRIGATION
DISTRICT.

J. W. TAYLOR,
President and Manager.

COOPERATION BY ALL WILL BRING SUCCESS

In a recent statement Mr. Joseph W. Taylor, president and manager of the Elephant Butte Irrigation District, Rio Grande project, said:

"We have been closely watching the trend of Federal reclamation since the creation of the office of commissioner and the appointment of Doctor Mead. We are forced to the conclusion that progress is slowly and surely being made, and it is our belief that acknowledgment of this situation should be made by displaying a spirit of cooperation and confidence."

THE GUERNSEY DAM ON THE NORTH PLATTE PROJECT

Andrew Weiss, superintendent of the project, describes the proposed dam and its relation to the water supply and power requirements of the project

THE Guernsey Dam is one of the features of the North Platte project, Nebraska-Wyoming, which has been under consideration for more than 20 years. It was one of the important items investigated at the initiation of the North Platte project in 1903 in connection with the Goshen Hole Division of this project. Then it was intended to function as a diversion dam for the so-called Highline Canal which it was proposed should divert from the North Platte River in The Narrows about 1 mile above the town of Guernsey.

In 1910 the Board of Army Engineers made a careful study of the possible project extensions, particularly with reference to further development on the south side of the river. Preliminary surveys were under way at the time this board made its inspection trip and after carefully viewing the topography and soil conditions, the location of the canal, and the various construction features connected therewith, the board recommended strongly that the Fort Laramie Division should be given preference to the proposed Highline Canal in point of time. The question of the sufficiency of the water supply for this Highline Division was also a serious desideratum, and it was recommended that this feature be given further study and determination before undertaking the construction of the Fort Laramie Division.

Altogether, the reasons were compelling for the postponement of the Guernsey Dam at that time. In later years, it developed that the diversion duty on the Interstate Canal was such as to cause apprehension and it was decided that the building of the Guernsey Dam as a storage feature presented a problem that would have to be met sooner or later. In addition, there are as yet a number of private canals which are not protected by any supplemental storage and the time may arrive when it will be necessary to provide for these to avoid shortage and crop losses.

It is also known that there occurs occasionally a succession of short run-off years when the storage will be entirely depleted and consequent shortages and crop losses may result. At any rate, the provision for further storage appears to be a needful measure to take care of such contingencies as will doubtless arise in the future in connection with the further development of the irrigation interests in the valley.

Primarily the Guernsey Dam is a storage feature. For this purpose, it is strategically located in a narrow canyon

ANCIENT ROMAN WRITER DEFINES AN ENGINEER

We are indebted to the Journal of Electricity for the following definition of an engineer, written by Marcus Vitruvius, who lived about 150 B. C.:

"He should be a good writer; a skillful draftsman; first in geometry and optics, expert at figures; acquainted with history; informed on the principles of natural and moral philosophy; somewhat of a musician; not ignorant of the sciences, both law and physics; nor of the motions, laws, and relations to each other of the Heavenly bodies.

"A normal philosophy will teach him to be above meanness in his dealings and to avoid arrogance. It will make him just, compliant, and faithful to his employer, and, what is of greatest importance, it will prevent arrogance gaining an ascendancy over him, for he should not be occupied by thoughts of filling his coffers, nor with the desire of grasping everything in the shape of gain, but by the gravity of his manners and a good character should be careful to preserve his dignity."

about two miles above the town of Guernsey. At this point and for some distance up and down the stream the river is about 250 feet wide at the low water line. A number of promising dam sites were investigated by borings and the most suitable one was found at this location. The dam is planned to be about 100 feet in height measured from the present river bottom. Only rough preliminary designs have so far been made so that it is premature to outline any definite description of this structure. Tentative plans so far considered contemplate the building of either an earth fill or part earth and part rock fill dam, 20 feet top width, upstream slope 3 to 1 and downstream slope 2 to 1. Both the upstream face as well as the downstream toe will be well protected by rock riprap and paving to insure safety against destructive wave action and backwash. Type and size of spillway have not been definitely decided upon, but the Bureau of Reclamation has in mind the necessity of making specially ample provisions here to take care of such floods as may be experienced

from a combination of the most adverse conditions. This might happen when both reservoirs might be filled to overflowing and at the same time a cloudburst spread over the portion of the catchment basin below Pathfinder, which might be further swelled by heavy snowfall run-off from the upper reaches of the stream. It has been estimated that such a combination might possibly result in a total overflow of approximately 100,000 second-feet.

The storage capacity of this reservoir is estimated at about 70,000 acre-feet. This represents only a part of the annual savings that may be effected by this reservoir because of its strategic location which enables it to serve as an equalizing reservoir and, as such, it may be filled twice or more in any year depending upon seasonal conditions.

In connection with the storage feature, it has always been planned to develop such power facilities as the situation may offer and justify. No definite figures can be given at this writing concerning the size of this power installation more than to state, that it is planned to supply the neighboring towns of Guernsey, Wheatland, Fort Laramie, as well as Hartville and Sunrise, and the C. F. & I. Co. works at the latter place. Power service has also been furnished for the past three years to the several valley towns east of Lingle, Wyo., down to and including Mitchell, Nebr. It is proposed to interconnect this plant with the Lingle plant of the Bureau of Reclamation, whereby suitable exchange service may be established and the efficiency of both plants thereby greatly increased. For example, the water passing the Guernsey Dam through the entire summer season will carry whatever load may be developed in the vicinity of both the Lingle and Guernsey plants, thereby making it unnecessary during such part of the year to draw upon the Lingle plant, thereby utilizing the entire canal flow for irrigation during such period. Conversely, during the winter months when the flow is necessarily low, both plants may be operated and thereby their combined capacity may be utilized to whatever extent may be necessary to supply the existing market.

The necessary right of way for this reservoir was purchased during the summer of 1922, at a cost of approximately \$100,000. The Second Deficiency Act, approved December 5, 1924, carries an appropriation of \$800,000 "for continued investigations, commencement of construction of the Guernsey Reservoir, and incidental operations."

SOUTH AFRICAN REPAYMENT AND SETTLEMENT PROBLEMS

A. D. Lewis, director of irrigation of the Union of South Africa, discusses in annual report the problems of South African irrigation development and how they can best be met

THE following extracts are from the introduction to the annual report of the director of irrigation of the Union of South Africa for the financial year ended March 31, 1923.

Legislation was introduced during the session of 1922 to make it possible to lessen the repayment charges on irrigation loans during the early years after the completion of new irrigation schemes. Section 6 of act 38 of 1922 reads as follows:

6. *Modifications of redemption provisions for irrigation loans.*—Notwithstanding anything contained in section one hundred and twenty-five of act No. 8 of 1912 as amended by act No. 26 of 1916, the Minister (as defined in the first-mentioned act) may, whenever special circumstances (such as failure of water supply, damage to crops, depression of markets or excessive costs during development) have made difficult the annual payment of sums under that section to redeem an irrigation loan, reduce, at the request of the borrower, those payments over a period not exceeding four years.

Provided that, At the end of that period, the aggregate amount of the reductions, together with interest thereon, is added to the amount of the loan for purposes of redemption, and the periodical payment required to redeem the loan is raised accordingly until the loan is entirely redeemed.

Acting on this, very considerable reductions were made for a number of boards, but I regret to have to report that even the reduced payments have in most cases not been made.

In view of the fact that the reductions were very great, I repeatedly urged that action should be taken under section 126 of the act, under which section the Minister of Finance can do what the boards have failed to do—namely, sue those who have not paid their rates; but no action has yet been taken. I must repeat what I stated in paragraph 6 of my report for 1920–21 that unless the irrigation rates, which are a first claim in case of insolvency, are rigidly collected, the financial credit of people in an irrigation district will fall low in the estimation of money-lending institutions, and the consequences will be disastrous.

While the act stands as it does, it is my clear duty to recommend that the stern action provided should be taken to collect the rates. The board should perform this duty, but it frequently happens that the biggest defaulters are members of the board, who are naturally not inclined to do it, and the unpleasant duty must in many cases fall on Government. The severity of enforcing the payment of rates could be tempered if Government

would take over surplus land at a fair price in lieu of rates; but this department had no powers or organization to deal with the purchase and settlement of land, and some proper machinery and organization must be evolved to deal with them.

I do not think the situation with regard to existing schemes should be considered apart from the problem of providing against a similar situation in future schemes. It would be fatal, especially in view of the present depressing world conditions, to rush into a panicky treatment. Irrigation development should go on steadily, and a sudden stoppage would not only lessen confidence in it, but would necessitate a disbandment of plant and staff acquired for the special purpose. The staff, for example, at present contains a large number of young South African graduates, to whom great attention has been given to train them in the special work, and it would be a pity to dispense with them just when they have become very valuable to the country.

Are the future schemes, then, to be carried out in the same way as in the past—i. e., by loans to boards with no special provision for rapid development and settlement, which are the essentials for success, and leaving large areas in the hands of the original owners with unlimited powers of speculation?

(Continued on page 32)



A four-year-old fruit orchard on the Umatilla project, Oreg.

SOUTH AFRICAN PROBLEMS

(Continued from page 31)

Although realizing all the disadvantages of State as compared with private activity, there is one class of scheme for which I have no hesitation in saying that the present board system should be abolished and the State should take far more active steps in land and settlement matters from the outset and that is in the case of large storage schemes for undeveloped areas.

Without disparaging the diversion schemes or the small storage schemes, which are essential to this country, and without enlarging on the reasons, which are somewhat technical, it can be safely asserted that without the large storage schemes we will never be able to make anything like full use of the available water of this country. From a national point of view the big storage schemes must be encouraged and carried out. But under a big storage scheme the whole nature of agriculture is changed. Intensive cultivation is required, and where one owner farmed before the scheme 100 farmers may be necessary when the scheme is completed. The business of causing this great change, of rapidly multiplying the number of settlers, is quite beyond the powers of a board of farm owners, and even the business of constructing such big storage dams is work for which they are not fitted. In such cases, then, I think the board method should not be adopted, and the State should handle the whole business of construction and land settlement from the outset.

The desirability of handing over the whole management of the scheme eventually to a private board should not be lost sight of, but at the outset the business of investigation, acquiring land, dividing it up, getting suitable settlers, financing and advising them, constructing and maintaining the scheme, and collecting rates should be undertaken by the State.

In my opinion a single organization should deal with all these matters, as it is likely to be a more efficient arrangement than a large number of separate departments dealing with them. The program of settlement should be closely linked up with the program of construction, and numerous activities should be coordinated. To take only the one matter of finance: The lands department, the land bank, and the irrigation department all make separate advances in the same irrigation scheme with separate provisions in parliamentary votes and separate arrangements for collecting repayments. In other countries where this problem has arisen, multiple control has been abolished in favor of single control, generally with some form of Government board with wide powers at the head.

The advantage of such a board is that a steady program can be planned in advance to meet fairly the needs of the country, and investigation can then be thoroughly made, especially into the land and settlement matters, before construction is rushed ahead by pressure from interested persons.

If some such organization is necessary for future schemes, should it not be created early to deal with the existing schemes also, especially with the urgent problem of acquiring surplus land and settling it on sound lines? On future big storage schemes the settlement of the surplus land should be considered at the outset of the scheme and should not be left till it is found that the rates are not being paid. If the present irrigation board method of starting a scheme is adhered to, some method of acquiring the surplus land before a loan is granted would have to be adopted. It is questionable, however, whether, if the prospect of big profits on the sale of land is removed when this policy is adopted, there will be sufficient incentive left to private owners in undeveloped areas to initiate the big storage schemes which are a national necessity. It will probably be necessary to abandon the irrigation board method at the outset and devise some means of favorably acquiring the land for the State, and if we can go as far as this we should also, in view of the national importance

MILK RIVER PROJECT GETS IDAHO FAMILIES

Options on the Hieronymous ranch and adjoining tracts of land west of Glasgow have been taken by K. L. Molen, agricultural development agent of the Great Northern Railway, assisted by Secretary Rugg of the Glasgow Chamber of Commerce. This is the initial step toward colonizing the Milk River Valley of that city.

Twenty Idaho settlers and their families arrived in Glasgow recently. It is the plan of the development department of the Great Northern to parcel the land out to the colonists in farm units from 80 to 160 acres where possible.

of such schemes, reduce the rate of interest on money spent on them and provide for specially favorable consideration of water rights.

I have written at length on this subject because the two most pressing matters requiring attention to-day are the non-payment of rates on existing schemes and the urgency of preparing for new schemes on sound lines, so that we may not be rushed into them hurriedly when the works now under construction are completed.

At the root of both matters is the urgent problem of the proper settlement of the irrigated areas, and I think it should be decided early how far the State will actively participate and by means of what organization.



The King Hill project, Idaho, is one of the favored spots for the lowly spud

Clemson Agricultural College

of South Carolina

NEW Library

RECLAMATION ERA

VOL. 16

MARCH, 1925

NO. 3



MAKING FURROWS PREPARATORY TO IRRIGATION

IT was Secretary Work who appointed the Fact Finding Commission, and it was the Fact Finding Commission that was responsible in a large measure for the present relief law. It was Secretary Work who appointed the present able Commissioner of Reclamation, Honorable Elwood Mead, who was one of the Fact Finders.

It is our opinion that these men and the local reclamation officials are working honestly and earnestly to put this new law into effect in order that the Government may be protected in the future and that the Government water user on all projects will get all that is justly due him.

*G. A. REMINGTON,
Manager Nampa & Meridian Irrigation District,
Nampa, Idaho.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

MARCH, 1925

No. 3

THE BOARD OF SURVEY AND ADJUSTMENTS

Organization of the board and of the local cooperative committees which will work in conjunction with the board in the classification of project lands and the adjustment of differences between the water users and the Government

SUBSECTION K of the fact finders bill provides, in part, that "on each existing project where, in the opinion of the Secretary, it appears that on account of lack of fertility in the soil, an inadequate water supply or other physical causes, settlers are unable to pay construction costs, or whenever it appears that the cost of any reclamation project by reason of error or mistake or for any cause has been apportioned or charged upon a smaller area of land than the total area of land under said project, the Secretary is authorized to undertake a comprehensive and detailed survey to ascertain all pertinent facts, and report in each case the result of such survey to the Congress with this recommendation."

One of the first steps taken by Secretary Work to put this provision of the law into effect was the appointment of a Board of Survey and Adjustments to classify the lands on the projects and adjust differences between the water users and the Bureau of Reclamation. Hon. Thomas E. Campbell, former Governor of Arizona, and Dr. John A. Widtsoe, former president of the Agricultural College of Utah, and both members of the Secretary's Fact-Finding Commission, were accordingly appointed adjustment advisers, and each designated chairman of the Board of Survey and Adjustments, which usually will function as two boards, one for the northern projects and one for the southern projects.

The other members of the board will be a representative of the State interested, appointed by the governor of the State, and a representative of the Bureau of Reclamation, appointed by the commissioner. When sitting as two boards, with Governor Campbell acting as chairman of one, and Dr. Widtsoe as chairman of the other, the additional members of each will be the State and the bureau representatives, making two boards of three members each.

These boards will be assisted by two soil experts, soil assistants for short

periods, occasional expert assistance for brief periods, chiefly from State colleges, and such stenographic help as may be needed.

In addition, the boards will receive direct and material assistance from the local cooperative committee on each project, composed usually of two water users and the superintendent, or of one water user from each division of the project

and the superintendent. The local cooperative committee has four principal functions, as follows:

1. To secure and supervise a classification of the lands of the project, according to the regulations printed on another page.
2. To state briefly in writing all project matters now in dispute or that now need adjustment.

(Continued on page 34)

SECRETARY WORK'S INSTRUCTIONS TO BOARD

*The Secretary of the Interior,
Washington, January 30, 1925.*

*Governor Thomas E. Campbell and Dr. John A. Widtsoe,
Board of Survey and Adjustments, Bureau of Reclamation.*

Gentlemen: You are authorized to make, under the direction of the Secretary of the Interior, comprehensive and detailed surveys of certain existing reclamation projects that will be hereafter from time to time designated to you by the Secretary for survey. These surveys are to be made under subsection K of the act approved December 5, 1924, entitled—

An act making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1924, and prior fiscal years, to provide supplemental appropriations for the fiscal year ending June 30, 1925, and for other purposes.

and which subsection K reads as follows:

That on each existing project where, in the opinion of the Secretary, it appears that on account of lack of fertility in the soil, an inadequate water supply, or other physical causes, settlers are unable to pay construction costs, or whenever it appears that the cost of any reclamation project by reason of error or mistake or for any cause has been apportioned or charged upon a smaller area of land than the total area of land under said project, the Secretary is authorized to undertake a comprehensive and detailed survey to ascertain all pertinent facts, and report in each case the result of such survey to the Congress, with his recommendations: Provided, That the cost and expense of each such survey shall be charged to the appropriation for the project on account of which the same is made, but shall not be charged as a part of the construction or operation and maintenance cost payable by the water users under the project.

I direct that these surveys be made with painstaking care and that all factors entering into the work be fully considered and properly weighed so that not only may accuracy be obtained but that confidence in that accuracy may be inspired by the way and manner in which the work is done.

It is very important that the greatest expedition consistent with the comprehensive nature of the work you are about to undertake be brought about, so that the benefits of the above referred to act of Congress may be realized by the settlers on the reclamation projects at the earliest possible date.

*Sincerely yours,
Hubert Work.*

OFFICIAL INTERPRETATION OF NEW LEGISLATION

All water users will be interested in this official interpretation of section 4 of the second deficiency act, comprising many of the recommendations of Secretary Work's Fact-Finding Commission

FOR the information of readers of the NEW RECLAMATION ERA, we are printing below the official interpretation, approved by the Secretary of the Interior on January 28, 1925, of certain parts of section 4 of the second deficiency act, comprising new reclamation legislation recommended by the Fact-Finding Commission. Other provisions of the act will doubtless require interpretation by the department, and this will be printed in the ERA as soon as available.

PROVISIONS AND INTERPRETATION

Subsection F provides—

That hereafter all project construction charges shall be made payable in annual installments based on the productive power of the land as provided in this subsection. The installment of the construction charge per irrigable acre payable each year shall be 5 per centum of the average gross annual acre income for the ten calendar years first preceding, or for all years of record if fewer than ten years are available, of the area in cultivation in the division or subdivision thereof of the project in which the land is located as found by the Secretary annually. The decision of the Secretary as to the amount of any such installment shall be conclusive. These annual payments shall continue until the total construction

charge against each unit is paid. The Secretary is authorized upon request to amend any existing contract for a project water right so that it will provide for payment of the construction charges thereunder in accordance with the provisions of this subsection or for the deferment of such construction charges for a period of three years from the approval of this section, or both.

The first sentence of this subsection reading, "That hereafter all project construction charges shall be made payable in annual installments based upon the productive power of the land," applies to all new projects and divisions of projects where the terms of payment have not already been established by contract or accepted water-right applications. Existing contracts can not be modified without the consent of both parties thereto and cases where a modification of existing contracts is necessary in order to apply the new plan of payment are covered by the last sentence of subsection F which provides that—

The Secretary is authorized upon request to amend any existing contract for a project water right so that it will provide for payment of the construction charge thereunder in accordance with the provisions of this subsection or for deferment of such construction charge for

a period of three years from the approval of this section, or both.

This provision vests discretion in the Secretary to amend existing contracts upon request. It is permissive, not mandatory. The words, "upon request" are understood to mean upon request of the other party to the water-right contract in question. The word "contract" itself implies a voluntary agreement and an amendment of an existing contract is a new contract which likewise requires the voluntary assent of both parties thereto. The claim that this provision is mandatory and leaves no discretion in the Secretary of the Interior in applying the new plan of payment when the new plan is requested, is not sustained by the language of the act, which is, "The Secretary is authorized upon request to amend any existing contract," etc. If it had been intended that there should be no discretion on the part of the Secretary, the act would provide, "The Secretary shall upon request amend any existing contract," etc.

Subsection F also provides: "These annual payments shall continue until the total construction charge against each

(Continued on page 35)

BOARD OF SURVEY AND ADJUSTMENTS

(Continued from page 33)

3. To collect and tabulate all available information relative to settlers' indebtedness, mortgages, delinquent taxes, and any other charges that must be met by the settlers now or in the near future.

4. To collect and classify all crop record data of the past 10 years or the years of record, by classes according to the land classification.

The reports of this committee, exclusive of the internal land classification, are expected to be ready for the consideration of the Board of Survey and Adjustments early in the spring.

The number of water users assigned to the local cooperative committees of the respective projects is tentatively as follows:

Yuma.—Two; 1 from the valley and 1 from the reservation district.

Grand Valley.—Two; 1 from each of the two districts.

Uncompahgre.—Two; from the project as a whole.

Boise.—Four; 1 from Black Canyon, 1 from Nampa and Meridian, and 2 from

Payette-Boise (1 from each of the two competitive boards).

King Hill.—Two; from the project as a whole.

Minidoka.—Two; 1 from the Burley and 1 from the Minidoka district.

Huntley.—Three; 1 from Pryor, 1 from Eastern, and 1 from Fly Creek division.

Milk River.—Three; 1 from the Chinook, 1 from Malta, and 1 from Glasgow division.

Sun River.—Two; 1 from Fort Shaw and 1 from Greenfields division.

Lower Yellowstone.—Two; 1 from No. 1 and 1 from No. 2 division.

North Platte.—Four; 1 from the Interstate, 1 from Fort Laramie, 1 from Northport, and 1 from Goshen district.

Newlands.—Two; 1 from each of the two divisions.

Carlsbad.—Two; representing the whole valley.

Rio Grande.—Two; 1 from the Leesburg and 1 from Rio Grande Improvement Co. division.

Umatilla.—Two; 1 from the east and 1 from the west division.

Klamath.—Three; 1 from each of the three divisions.

Belle Fourche.—Two; from the project as a whole.

Strawberry Valley.—Two; representing the whole project.

Okanogan.—Two; representing the whole project.

Yakima.—Two; 1 from the Sunnyside and 1 from the Tieton division.

Shoshone.—Two; 1 from the Garland and 1 from the Frannie division.

The purposes of the Board of Survey and Adjustments, appointed by Secretary Work, are defined as follows:

1. In general, to determine conditions on the projects with a view to applying the remedial measures provided in the act of December 5, 1924.

2. In particular, to make the surveys and reports required by subsection K.

3. To make recommendations for contracts and agreements that may secure regular payments for construction and for operation and maintenance.

4. To help promote good feeling among the water users.

unit is paid." Some of the water users on certain projects claim that this provision indicates an intent on the part of Congress to release the guarantees given to the Government by the various irrigation districts and water users' associations and that the Government take a loss whenever any individual farm unit for any reason proves incapable of paying its pro rata share of the project construction cost.

This argument is largely answered by the fact that the authority to amend existing contracts is permissive and not mandatory and if the Secretary is not required to amend existing contracts at all he is certainly not required to do so for the purpose of releasing guarantees given by water users' organizations and throwing a loss on the reclamation fund which the Supreme Court has held it was not intended should occur. The intent underlying the reclamation act is stated by the Supreme Court as follows in the case of *Swigart v. Baker* (229 U. S. 187, 57 L. Ed. 1143).

That fund was the proceeds of public land and was not intended to be diminished for the benefit of any one project, but, without increase by interest and undiminished by local expenses, was again to be used for constructing other works. The cost of surveying those projects which were not developed and the administrative expenses not chargeable to any particular project might not be repaid, but these sums were so small as to be negligible as against the fundamental idea of the bill, that the proceeds of public land as trust fund should be kept intact and again invested and reinvested for constructing new irrigation works.

From time to time as repayment contracts were made with the various irrigation districts and water users' associations, the Secretary of the Interior attempted to carry out the intent of the act and protect the trust fund in question by requiring the water users' organization, whether a district or association, to guarantee the water-right payments of its members or to make lump-sum payments sufficient to cover the annual payments for the entire project or division covered by the district or association. Under this practice the water user has a primary obligation to pay the portion of the cost of the project apportioned to his particular farm unit or specified in his water-right application and a secondary obligation as a member of an irrigation district or water users' association, to pay assessments if necessary to carry out the guarantee given by the association or district. This secondary liability assumed by reason of the guarantee given by the district or association of which the individual is a member, is referred to by the water users of some of the projects as a joint liability and it is contended by some of the water users that the sentence of

subsection F reading "These annual payments shall continue until the total construction charge against each unit is paid," requires the Secretary to release districts and associations from their guarantees or agreements to make lump-sum payments and thereby relieve the individual members of the association or individual landowners of the district as the case may be, from any responsibility except for a portion of the project construction cost as specified in the individual water-right application or apportioned to the land of the individual landowner of the district.

In every large body of land there will be some tracts which, for one reason or another, will be found incapable of paying construction charges and if the guarantee of the district or association which has been given for the purpose of avoiding loss to the fund in such cases should be released, a loss to the fund would occur and it was to prevent such losses that the settlers' organizations were required to guarantee the payments.

A modification of existing contracts for such purpose would be contrary to the intent of the reclamation law as construed by the Supreme Court in the *Swigart v. Baker* case. The general intent of the new act appears to have been to grant more favorable terms of payment for the purpose of enabling the projects to pay out in a longer period of time. Nothing in the new law requires release of district or association guarantees under existing contracts and so far as the releases of guarantees would tend to deplete the fund would be contrary to the general purpose of the reclamation law as construed by the Supreme Court. If it had been the intent of Congress to change the policy of the reclamation law with respect to the return of the fund in full, it is reasonable to expect that Congress would have expressed some such intent in a plain and definite way, particularly in view of the well-known decision of the Supreme Court. But what was done by Congress was merely to vest discretionary power in the Secretary to amend existing contracts.

Another question which has been raised with reference to the construction of subsection F is the question whether the terms of payment provided under this subsection may be allowed to water users or water users' organizations which have contracted for a supplemental water supply under the Warren Act. In most cases the holders of such Warren Act contracts have contracted for a comparatively small additional water supply and would not desire to adopt the new plan of payment for the reason that their annual payments under their present contracts for the limited amount of water which they are re-

ceiving from the Government works, is lower than would be the payments under the new plan of payment based on the average gross acre income; but in cases where the amounts to be paid by such Warren Act water users is comparable to the amounts paid for a full Government water right, the same reason exists for applying the new plan of payment as in the case of the water users who receive their entire water supply from the Government works and there appears to be nothing in subsection F which would prevent the application of the new plan of payment to Warren Act water users in cases where the new plan is desired by the water users and found by the Secretary to be desirable. The language of the last sentence of subsection F is, "The Secretary is authorized, upon request, to amend any existing contract for a project water right so that it will provide for payment of the construction charge thereunder in accordance with the provisions of this subsection." The term, "to amend the contract for a project water right" is understood to be broad enough to apply to any contract for water from the project works, and that any contract for water from the project works, whether a complete water supply or only a partial water supply, may be considered as within the authority granted the Secretary under this subsection.

Another question which has been raised in connection with the interpretation of subsection F is the question whether in cases where the three-year deferment of construction charges is granted under the last sentence of subsection F but the new plan of payment on the basis of average gross acre income is not granted or desired, the three-year deferment of construction charges would result in the four years' construction charges all becoming due at once at the end of the three-year period. Such a construction would lead to impractical results. If settlers have difficulty in meeting annual construction payments as the same come due, obviously, it would not be practical for them to pay four annual construction payments in one year and it would not be presumed that Congress intended such an obviously impractical result. The language of the act applicable to this question is as follows: "Or for the deferment of such construction charges for a period of three years from the approval of this section." The word "such" in the expression "such construction charges" relates back to the construction charge last above mentioned in the act which is as follows: "The Secretary is authorized, upon request, to amend any existing contract for a project water right so that it will provide for payment of the construction charge

(Continued on page 36)

VARIOUS SUBSECTIONS DISCUSSED AND INTERPRETED

Control of the projects, operation and maintenance payments, formation of water users' associations and irrigation districts, disposition of net profits, and adjustment of water charges considered

(Continued from page 35)

thereunder in accordance with the provisions of this subsection. Consequently, the expression "such construction charges," referring back to the term "the construction charge," relates to the entire construction charge in whatever number of installments it may be divided and not merely to three annual installments of the construction charge. Consequently, the effect of this provision is to defer "the construction charge," including all unpaid installments, for a period of three years and not merely to suspend three installments and thereby require four annual installments to be paid in one year. This interpretation avoids the obviously impractical results of requiring four annual payments in one year and also appears to be the natural meaning of the language used in this subsection.

The closing portion of subsection G reads, "and when the water users assume control of the project the operation and maintenance charges for the year then current shall be covered into the construction account to be repaid as part of the construction repayments." The words "charges for the year then current" mean those made for the year in which the operation and maintenance is assumed by the water users. Thus, if operation and maintenance is turned over during the year 1925, all expense incurred by the United States for operation and maintenance and which thereupon would constitute "charges" for that year will be covered into the construction account. That is, they will be transferred from the operation and maintenance account to the construction account. If at the time operation and maintenance is assumed by the water users no operation and maintenance expense has been incurred during the current year, there will be no operation and maintenance "charges" to be transferred.

The suggestion has been made that the clause discussed requires that the operation and maintenance cost for the year control is assumed be paid by the United States and charged into construction, whether operated by the United States for the full year or by the water users during a portion of that year. In the latter case the cost of operation and maintenance must be advanced or the bills and other expenses incurred by the water users must be paid by the United States monthly or otherwise.

It is not believed that the phrase "operation and maintenance charges" is synonymous with operation and maintenance

expense. The term "operation and maintenance charges" is one that heretofore has had a well-defined significance, meaning charges due the United States for service performed in operation and maintenance of the project, which is the interpretation given it in this connection. It could hardly mean in this sentence cost incurred by the water users for their own benefit after control has been assumed. Therefore the United States is not called upon to advance or pay to the water users a sum sufficient to enable them to operate and maintain the project for themselves, merely in order that there may be "charges" in the operation and maintenance account to be transferred to the construction account. Had this been intended the word "expense," or some term other than "charge" should have been employed. It is believed the provision is designed merely to obviate the necessity of the water users being required to pay in one year operation and maintenance charges for two seasons which would be necessary when changing from the present plan, under which payment is made at the end of the season, to that which requires payment in advance.

Subsection G of the act provides:

That whenever two-thirds of the irrigable area of any project or division of a project shall be covered by water-right contracts between the water users and the United States, said project shall be required, as a condition precedent to receiving the benefits of this section to take over, through a legally organized water users' association or irrigation district, the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as the Secretary may prescribe, and thereafter the United States, in its relation to said project, shall deal with the water users' association or irrigation district, and when the water users assume control of a project, the operation and maintenance charges for the year then current shall be covered into the construction account to be repaid as part of the construction repayments.

The application of this subsection to any project or division depends on the question whether two-thirds of the irrigable area of the project or division in question is covered by water-right contracts. Such contracts may be either in the form of accepted water-right applications from water users or a contract with the district or other water users' organization covering the entire irrigable area or two-thirds thereof. The intent of this subsection is to encourage the water users in the taking over of the operation of the irrigation works or a part thereof

on each project. Such operation and maintenance by the water users' organization is a prerequisite to the granting of the benefits of the new plan of payments and also to the funding of delinquent charges under subsection L and the deferment of charges under subsection F.

Subsection I provides—

That whenever the water users take over the care, operation, and maintenance of a project, or a division of a project, the total accumulated net profits, as determined by the Secretary, derived from the operation of project power plants, leasing of project grazing and farm lands, and the sale or use of town sites shall be credited to the construction charge of the project, or a division thereof, and thereafter the net profits from such sources may be used by the water users to be credited annually, first, on account of project construction charge, second, on account of project operation and maintenance charge, and third, as the water users may direct. No distribution to individual water users shall be made out of any such profits before all obligations to the Government shall have been fully paid.

The difference in the language used with reference to the total accumulated net profits from past operations which it is provided, "shall be credited to the construction charge of the project" and the language used with reference to net profits thereafter secured from such sources, which, it is provided, "may be used by the water users to be credited annually, first on account of project construction charge, second on account of project operation and maintenance charge, and third as the water users may direct" indicates a different intent with reference to these two classes of profits. The last sentence of this subsection reading, "No distribution to individual water users shall be made out of any such profits before all obligations to the Government shall have been fully paid," appears to apply to all profits of both classes. The credit of the "total accumulated net profits" from past operations, as determined by the Secretary, "to the construction charge of the project" results in lessening by that much the total construction obligation, consequently construction payments on the basis of average gross acre income would be completed at an earlier date than would otherwise be the case; but each annual installment based on the average gross acre income would remain the same until the end of the payment period. But the provision with reference to net profits hereafter realized from such sources to be credited annually first on account of project con-

struction charge and second on account of project operation and maintenance charge, is understood to provide for the application of future profits annually upon the annual construction charges as the same come due. That is, such credit for future profits will be applied annually, first to construction charges, beginning with the construction installment first coming due and continuing with subsequent construction installments as far as such credit will go, and then in the same manner upon operation and maintenance charges when the time arrives that the project construction charges have been completed.

Subsection J provides that profits of the class described in that subsection shall be credited to the project or division of project to which the construction cost has been charged, but does not specify whether the same should be credited on construction or operation and maintenance. It is therefore believed to be within the discretion of the Secretary of the Interior to determine the manner of applying such credit. In this connection, however, it is noted that this fund is to be applied as a credit and not turned over as a cash payment from the Government. Consequently if the water users' organization takes over the operation and maintenance of the irrigation system or a part thereof and collects and pays its own operation and maintenance expenses there will be no indebtedness from the water users to the United States for operation and maintenance except the operation and maintenance of reserved works in cases where only a part of the irrigation works are turned over and in cases where all of the irrigation works are turned over there would be no indebtedness to the Government on which a credit could apply except indebtedness for the construction payments.

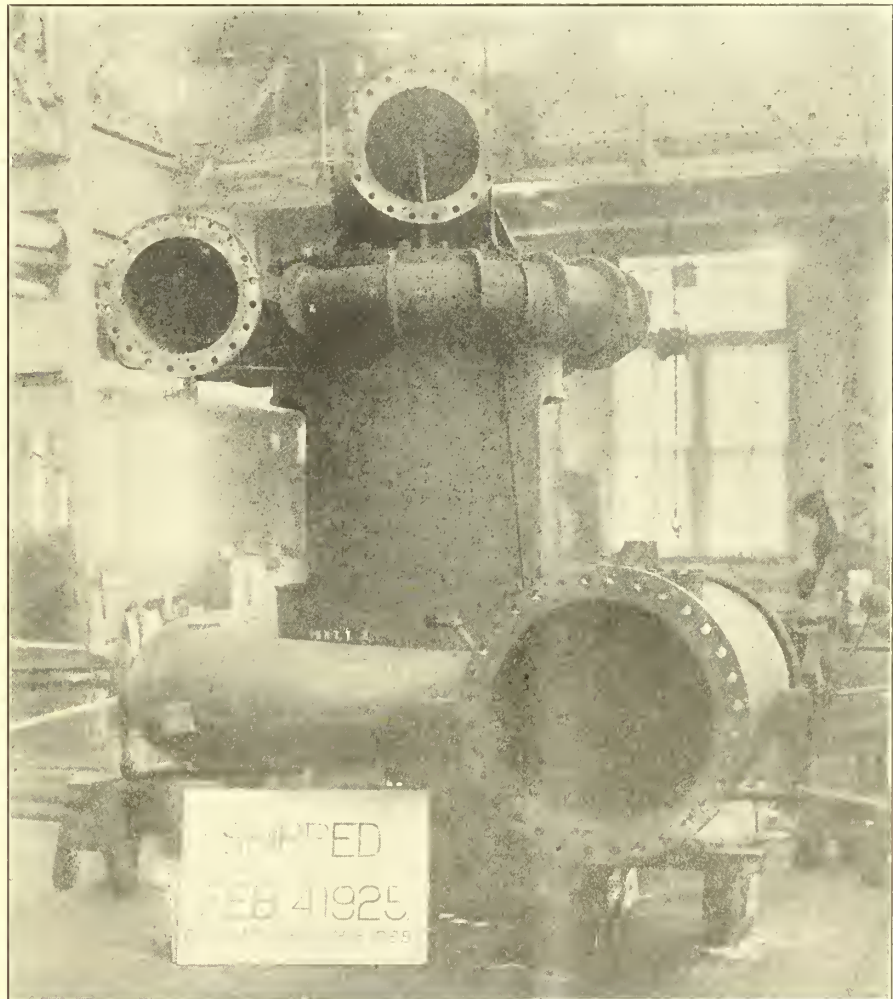
Subsection L of the act provides—

That in any adjustment of water charges as provided in this section all due and unpaid charges to the United States, both on account of construction and on account of operation and maintenance, including interest and penalties, shall be added in each case to the total obligation of the water user, and the new total thus established shall then be the construction charge against the land in question.

In this subsection the words "in any adjustment of water charges" are understood to indicate the time which will determine what charges are due and unpaid and what charges will thereafter be added in each case to the total obligation of the water user. It is believed that the adjustment of water charges occurs on the date when the adjustment contract is made and that the charges due and unpaid on that date are the charges added in each case to the total obligation.

Attention is called to the fact that so far as the construction charges are concerned, the provisions of subsection L and the provision of the last sentence of subsection F may overlap if the adjustment contract is made at a date later than December 1, 1925. As the provision with reference to the deferment of construction charges is "for a period of three years from the approval of this section" so that the three years' deferment, if granted applies to the construction charges of 1925, 1926, and 1927; and in the event of an adjustment contract of later date than December 1, 1925, providing for deferment of construction charges, the 1925 construction charges would be a delinquent charge covered by subsection L as well as by the deferment provision of subsection F. It may be argued that the language of subsection L tends to encourage dilatory practices

in the making of adjustment contracts under the new act. But this would not be true as to construction charges under any contract providing for deferment of construction charges as such construction charges for 1925, 1926, and 1927 would in any event be funded, and as applied to operation and maintenance charges the provision of subsection L would have to be considered in connection with section 6 of the extension act, which states, "no water shall be delivered to the lands of any water-right applicant or entryman who shall be in arrear for more than one calendar year for the payment of any charge for operation and maintenance or any annual construction charge and penalties." This provision is still in force and will prevent any extensive delay with reference to the operation and maintenance charges in question.



One of two water-wheel-driven pumping units for the Orchard Mesa pumping plant, Grand Valley project, Colorado. These units will each deliver 30 cubic feet per second at an elevation of 130 feet. These pumps replace a worn out plant which has supplied water to the highly cultivated lands of the Orchard Mesa district for many years. Through the cooperation of the contractor, the Worthington Pump and Machinery Company, shipment of these units has been made several weeks in advance of the contract date, thus insuring the delivery of water to these lands early in the coming season.

LAND CLASSIFICATION ON THE PROJECTS

Local cooperative committees are appointed on each project wishing to take advantage of the fact finders' bill to make a classification of the project lands for the information of the Board of Survey and Adjustments

FOR the purpose of carrying out the provisions of subsection K of the fact-finders' bill, a committee, known as the local cooperative committee, has been formed on each project wishing to take advantage of the law. Ordinarily this committee consists of three members, composed of two water users selected by the organization of water users, and the project superintendent; or of one water user from each division of a project in case there are two or more divisions, and the project superintendent; thus giving at least two representatives of the water users on each of these cooperative boards. One of the first duties of this local cooperative committee is to secure and supervise a classification of the project lands, according to the following regulations:

PROJECT LAND CLASSIFICATION

Purpose.—This survey is intended to determine for the project (a) the areas of permanently or temporarily unproductive lands, and (b) the areas of lands of different productive power. The unproductive lands will be made the subject of a report to Congress under subsection K of the act of December 5, 1924, and the areas of lands of different productive power will be used in the application of the new method of repayment as authorized in subsection F of the same act.

Classes.—It is intended that the productive lands of the project be grouped into four classes, the best lands as No. 1, and the poorest as No. 4; and that the unproductive lands be grouped into two classes, those temporarily unproductive as No. 5, and those permanently unproductive as No. 6.

It may be found on some projects that the productive lands may be grouped into only two or three classes. Whenever this condition exists there will be no need of a more refined classification. Likewise, on some projects all the lands may be agricultural. In such cases classes 5 and 6 are not considered.

The primary object of the survey should be to separate the lands into classes according to the producing power of the land, whereby the purposes of subsections F and K of the above-named act may be accomplished.

General considerations.—The land classifiers should consider in their examinations, assuming a water right sufficient for crop needs, (a) the natural productive power of the soil under good agricultural

practice, (b) other conditions that influence productivity such as uneven topography, making irrigation difficult and expensive, alkali, gravel subsoil, hardpan, water-logging, forest covering, etc., and (c) the distance of the land from railroads and other carriers, and from markets. The combination of these factors will determine the class to which a given farm unit belongs. All lands should be rated according to their relative possible productivity under good farming methods. Therefore, good land, yielding small crop returns because of improper farming, should be classed with good land, well tilled, and giving large crop returns. As far as possible the farmer, as a factor in crop production, should be eliminated from consideration.

Rules.—The following rules for classifying project lands are only suggestive. Each project has its own peculiar problems and, therefore, the local classifiers must make such adjustments as will make the plan applicable under existing conditions. It is presupposed that the local committee in charge and the classifiers will be personally and intimately familiar with soil conditions on the project, and that the classifications will be based, largely, upon this knowledge.

The inherent fertility of the soil and the topography of the land are the two chief factors of consideration. Distance from carriers or markets is usually of minor importance. The relative possible acre income under comparable systems of agriculture should be the determining test.

Class 1.—Lands that with sufficient water and under approved systems of tillage, produce the best crops on the project, and that have such even topography that they may be easily irrigated, with a minimum of leveling and labor under the approved system of irrigation practice for the project. These are the best lands on the project—of good soil and good topography.

Class 2.—Lands of the same productive power as those in class 1, but with a topography so uneven as to require more expense and more labor in the tillage and irrigation of the fields. Such lands because of their topographic difficulties are generally less capable of sustaining a completely diversified kind of agriculture. These are usually good lands of poor topography.

Class 3.—Lands of lower fertility or productive power, even with ample water and under good systems of husbandry,

than those of the above classes. These lands may have even topography, therefore easily irrigated, but are incapable of producing the yields of the lands under classes 1 and 2. The cause of this infertility may be inherent in the soil or may be due to alkali, gumbo, blow sand, shale, shallow or porous soil, or other factors characteristic of the project. These are poor lands, often of good topography.

Class 4.—Lands of poorer productivity than those of class 3, or of the same grade as class 3, but with such unfavorable topography as to increase the expense of cultivation and irrigation and to decrease the crop yield. These are poor lands of poor topography, often with excessive slopes.

Class 5.—Lands that are not at present susceptible of agricultural use, but which may gradually by tillage and under changing conditions be made sufficiently productive to justify cropping. Alkali and water-logged lands that may be improved by drainage; excessively heavy soils that may be improved by the incorporation of organic matter or indirect fertilizers; light, sandy soils that may be firm by plant roots; steep soils that may be leveled, and other such soils, should be included in this class.

Class 6.—Lands that appear to be permanently nonagricultural under the practices of irrigation farming.

Organization.—The project land classification or practical soil survey is in charge of the local cooperative committee. The board should choose a chairman from among its members.

The local cooperative board should employ one or more land classifiers, depending upon the time available and the local conditions, who should do the actual field work and report to the committee.

Preliminary work.—At least one day and preferably two days should be spent by the committee and the classifiers jointly in a thorough consideration of the application of the general rules to the conditions of the project. This is best accomplished by the committee and the classifiers spending the time in the field for the purpose of actually classifying some of the more difficult units on the project. The difficulties thus presented, discussed, and decided, will greatly help the classifiers in their later independent work.

On one of the most difficult projects this method was followed. After a unit

(Continued on page 39)

ADEQUATE FARM LOANS FOR IRRIGATED LANDS

Extracts from comprehensive paper presented by B. J. Seger, Secretary-Treasurer of the North Platte Valley Water Users' Association and the Farmers' Irrigation District before the Nebraska State Irrigation Association

IT IS not the purpose of this paper to present a plan for securing loans which will enable the landowner who is already deeply in debt to increase his indebtedness; but to show, if possible, how adequate loans may be secured where it is not possible at the present time.

Practically every farmer who buys land under an irrigation project has some cash and equipment at the start; but whether much cash or little, he builds improvements in accord with the cash he may have, with the result that his funds are soon exhausted and usually he has not been in the community for sufficient time to establish his personal credit. If he tries to borrow on his land from regular loan agencies, he seldom meets with success. The local bank as a rule is not in position to loan sufficient funds on the security the individual farmer is able to give, nor can the banker loan him for sufficient length of time to give the farmer opportunity to get his farming operations on a paying basis. How, then, can the irrigation farmer or landowner secure a loan for a sufficient amount which will allow him to purchase needed stock and equipment?

In a good many communities in this and other States, groups of farmers have organized mutual loan associations for the purpose of purchasing dairy stock. Where properly organized, they have been successful. The amount of authorized capital depends on the size of the organization. The par value of one share is \$100. Four kinds of stock are sold—paid-up stock, partial-payment stock, investment paid-up stock, and partial-payment investment stock. After sufficient funds are secured from the sale of stock, money is then loaned at a low rate of interest to those desiring to purchase dairy stock, the cows purchased being given as security.

Such an organization could be organized by a group of 100 to 500 land owners on a somewhat larger scale. An organization of this kind could be organized under the present laws of the State if the name included the word "savings" such as Mutual Loan and Savings Association.

It would be feasible for land owners under new projects and those land owners under one or more older projects to organize such an association. In combining several projects, especially if small, it would be possible to provide sufficient funds to loan to the stockholders if funds from some outside source could be secured equal to the amount raised from the sale of stock of the association.

The United States Department of Agriculture recently issued a bulletin entitled "Irrigation District Operation and Finance," in which it was stated that two of our Western States have assisted irrigation districts in those States by loaning the credit of the State, in this manner: The State issues bonds which are sold and the proceeds of the bonds loaned to the irrigation district. The district pays the interest on the bonds, and takes up the bonds at the end of 5 or 10 years.

Since this has been done in other States with good results, provision might be made whereby the State of Nebraska would loan its credit in the same manner to loan associations formed under irrigation projects for agricultural purposes, making it possible for the association to borrow an amount equal to the paid-up stock of the association. This would furnish sufficient funds with which to make loans. The amount loaned to the individual could be increased from year to year, as the funds for loan purposes increased. All loans to the members should be from one to three years with interest at 5 to 6 per cent.

After the association had been organized for a few years, funds would be returned from interest and loans paid, which would enable the organization to have a revolving fund large enough for the needs of the members.

The advantage of such an organization on a new project would be that all of the improvements, stock, farm equipment, and credit of its members could be utilized to the fullest extent as security behind the stock issued. The members of the association would be enabled to borrow money at a low rate of interest with which to purchase income-producing stock and needed improvements. The better the farmer's equipment for bringing in returns, the quicker would he be able to get on his feet financially.

A mutual loan organization would not need to interfere with the regular banking business in the community, as the banks prefer 30, 60, and 90 day loans. With such an organization on the projects to take care of the long-time loans, the banker would be able to adhere to the short-time loans. Since none but stockholders could secure loans from the association and only for agricultural purposes, there would still be a large field for the services of the local banker.

With a loan association on the projects to take care of the needs of the farmer for the first few years, he would soon be established on a good financial basis. Members of such an organization would have no trouble in securing real estate loans from the Federal land bank or from the Lincoln Joint Stock Land Bank. The fact that such landowners had a success-

(Continued on page 40)

PROJECT LAND CLASSIFICATION

(Continued from page 38)

had been examined and discussed a secret ballot was taken on the class in which the unit should be placed. A committee of six thus voting were unanimous on seven units, and had only one dissenting vote on six other units. Care in this preliminary work will ultimately save time, and bring about a better appreciation of the work among the water users.

Cooperation with the water users.—The land classifier should discuss as far as practicable each unit with the individual landowner. The farmers are usually the best judges of the producing power of the soil, and they know the local conditions that the classifier must consider. No person is as close a student of a farm unit as the farmer who lives on and operates the farm, and who not only has the opportunity but the incentive to make a close study of these matters. Such con-

sultation between the land classifier and the farmer is important also because the farmer appreciates the privilege of discussing the problem with the classifier even though the result is not materially affected by such consultation.

Report to local cooperative committee.—The land classifier should report regularly the work that he has done, giving clearly each farm unit and the class to which it has been assigned. The local cooperative committee should then review, test, and accept, or change the findings of the classifiers.

Soil map.—A map of the project should be prepared in the project office, on which the land classification should be indicated, each class to be designated by a special color or shading. This map should show clearly the lands proposed to be excluded from the project.

CREDIT CORPORATIONS AND LOAN ASSOCIATIONS

Mr. Seger discusses the advantages of these two methods of financing the settlers, pointing out the importance of the best possible financial basis in connection with the economic development of the projects

(Continued from page 31)

ful loan organization would give the loan companies confidence in the individual members and in their ultimate success.

It is quite certain that loans secured from the Federal land bank will be more satisfactory as to amounts loaned, when irrigation projects and the landowners under them realize the importance of getting their indebtedness on a basis which will not be burdensome to them, and therefore not so hazardous for the loan company.

The joint stock land bank has not yet made any loans on irrigated lands in Nebraska. I believe that it will do so just as soon as a project and the landowners under it can demonstrate their ability to pay their obligations when due. The rules of this bank permit it to make loans to a landowner whether he lives on the land or not; but the owner must live in the vicinity of the land so that he can give the operations of the farm his personal supervision.

Both of the loan agencies mentioned make farm loans at a low rate of interest on the amortized plan of repayment. After a number of years of experience this plan of repayment is found to be the most satisfactory. This kind of loan seems to be the best for the landowner for the reason that the yearly payments are not excessive, and a small part of the principal is paid each year.

I am fully convinced that it would be entirely feasible and proper to ask the State not only to lend its credit to enable irrigation farmers to secure working capital, but to show more interest in the agricultural problems of the farmer on irrigated lands. It is certain that the irrigation farmer must be able to secure loans at a low rate of interest and for a reasonable length of time for repayment if he is to succeed.

We will now consider loans under old-established irrigation projects, including the North Platte (Interstate) project.

The first plan I wish to consider is the feasibility of organizing an agricultural credit corporation. I would consider this plan practical only for the larger irrigation projects. Such a corporation can be organized with five or more persons, and is very much the same as any corporation in its organization and purpose with the exception that it is subject to the approval and under the supervision of the United States Comptroller of the Currency. Provision is made in the Federal land bank act for such a corporation. An agricultural credit corporation can not organize

without a paid-up capital of not less than \$250,000. This organization operates in some respects like a bank. It may discount notes, warehouse receipts, and other paper, and may borrow money and loan money at a rate not to exceed the legal rate for the State. Such an organization must deposit its surplus funds in a Federal reserve bank.

Certain irrigation districts that have made a special effort to see that at least one year of irrigation taxes were paid each year have been well repaid for the effort, and I am sure that the boards of such districts would not think of relaxing in their efforts to secure the payment of taxes. They feel that the time is past when a landowner should receive water year after year and make no effort to pay his irrigation taxes.

It is quite certain that if every irrigation district board represented here would start in now with the proposition that no water would be delivered to a single tract of land unless at least one year of taxes were paid, those districts would find their credit and that of the individual landowners materially increased.

As the agricultural credit corporation is for the purpose of assisting the farmer, all loans must be for agricultural purposes, such as the purchase of dairy cows and improvements. If sufficient funds could not be raised from the sale of stock in the beginning, the same plan could be used as for new projects—that is, securing the loan of the credit of the State for funds equal to the amount of paid-up capital, the loans made by the agricultural credit association to be for one to three years with approved security. Such an organization should include considerable territory, such as an entire county or a large project having from 50,000 to 100,000 acres of land. An organization of this character, if well established, and after it has gained a credit standing with the Federal reserve banks, would have no difficulty in securing funds for loan purposes.

On reclamation projects, not only the credit of the State might be secured, but also that of the Government. Reclamation funds might be loaned for this pur-

pose. That fund receives about half a million dollars per month from the sale of public land and oil leases. It would be entirely reasonable to ask that the Government loan to its own reclamation projects, where an agricultural credit corporation or a credit association had been properly organized, an amount equal to the paid up capital of the organization, on the dollar matching plan.

This plan is used in the building of roads, with the difference that the money furnished by the Government for road building is never paid back, whereas the money borrowed from the reclamation fund for loan purposes would be paid back with interest at the rate of 3½ to 4 per cent. The Government has already furnished \$400,000,000 for road building to States putting up an equal amount. It would be practical for the Government to loan funds to the State and the State in turn to loan to agricultural credit associations or mutual loan associations under regulations similar to the method now used for furnishing money for the building of State and Federal highways.

With the money borrowed from the State or reclamation fund as the ease might be, added to that received from the sale of stock, a fund would be built up in a comparatively short time which would be ample for loan purposes, and when the loans began to be repaid a revolving fund could be built up, so that there would always be funds to loan on proper security.

With the new reclamation relief bill which has recently been enacted into law, it would be a most opportune time for the land owners under Government projects to organize an agricultural credit corporation. A strong organization could be built up in a short time which would serve the needs of the Government projects on both the north and the south side. Even with the new relief bill in operation practically all land owners under the two projects will need loans at a low rate of interest to take up high-interest-bearing debts and to purchase needed income-producing stock.

The second plan, the mutual loan association, might be more satisfactory for the smaller projects. The land owners on several of the smaller projects might join together and organize one agricultural credit corporation which would serve the needs of all.

With mutual loan associations or agricultural credit corporations to assist the land owner on irrigation projects in secur-

ing one to three-year loans at 5 to 6 per cent, the farmers would in a few years have such a good financial standing that the Federal land bank and the joint stock land bank would be willing to come in and make adequate loans for the long-time periods at a low rate of interest. When that time came, there would be no foreclosures, for the loans would be the kind on which the principal never becomes due.

No project can be an entire success, no matter what the plan of financing may be, unless some definite system is established for the collection of irrigation taxes each year. Our present law provides that an irrigation district board may refuse to deliver water to land owners who owe more than one year's irrigation taxes. This law might be considered lax in comparison with many western irrigation projects, where it is required that the irrigation taxes be paid before water is delivered to the land. I believe that our own State law is good if irrigation district boards would enforce its provisions. I believe that the time is coming soon when the irrigation district boards which make no effort in the matter of the collection of taxes, will be considered failures by financial and loan companies, and those agencies will refuse to purchase securities of such projects and will refuse to make loans on those lands.

To sum up briefly: First, realize the importance of having the irrigation system of both new and old projects on the best possible financial basis and in good physical condition with the debt spread so that the yearly charges can be met easily by placing the bonded debt on a serial plan for repayment, paying not less than 1 per cent of the principal each six months, and if warrants are two or more years behind in payment, fund the warrants into a short-time serial bond issue and thus get the district on a cash basis.

Second, on new projects, if adequate loans can not be secured, organize mutual loan associations, combining with several older projects when advantageous to do so, the State to loan its credit by issuing bonds to be sold, the proceeds equal to the amount of the paid-up capital, of the loan association to be loaned to the association, and that organization to pay the interest on the bonds so issued; these bonds to be repaid by the association in 5 to 10 years; the association to make loans to its members for 1 to 3 years at a rate of interest not to exceed 6 per cent.

Third, on well-established projects, where sufficient loans can not be secured from loan companies at a low rate of interest, organize agricultural credit corporations on the larger projects or mutual loan associations on the smaller projects; the corporation to issue stock

YAKIMA PROJECT WIPES OUT DEFICIT

J. L. LYTEL, superintendent of the Yakima project, has brought to the attention of Commissioner Mead a very gratifying situation on this project in connection with the operation and maintenance work for the calendar year 1924.

On the Tieton division, where 32,000 acres are being irrigated, the operation and maintenance work has been handled in such a manner during the past five years that a deficit of \$2,475 existing in 1920 has been wiped out. In addition, the material on hand in the storehouse, or inventory, and all the equipment used for operation and maintenance on the division, valued at \$22,000, have been paid for out of the operation and maintenance fund; and on December 31 there was a surplus in the fund of \$8,310.

to be sold to its members and others to build up a fund; the State to loan its credit for the purpose of issuing bonds in amounts equal to the amount of paid-up stock of the corporation or the Government to loan to the State or directly to the credit corporation, to be repaid when a revolving fund has been established.

Fourth, make every effort to get the finances of the district and the individual landowners on such a good basis that the Federal land bank and the joint stock land bank and other loan agencies will prefer to place loans on irrigated lands rather than on other lands.

Fifth, realize that no financial plan will be successful if taxes are not paid with reasonable promptness; and, further, that irrigation district boards should realize that it is a part of their business to see that irrigation taxes are paid each year.

Sixth, that with the enactment into law of the new reclamation relief bill, landowners under Government projects should realize the importance of forming some form of mutual or credit corporation organization to insure success to those forming under these projects.

Success will come eventually to every irrigation project whose directors and officers make an earnest effort to get the finances of the project on a good business basis. The farmer, under such projects, will succeed when payments are so arranged that he can be certain of meeting them. A farmer can not put forth his best efforts in growing maximum crops and in raising and feeding stock if he is continually discouraged by an overwhelming amount of taxes to pay, with no relief in sight.

The operation and maintenance budget for 1925 provides for an estimated gross cost of \$88,000, the amount agreed to by the board of directors of the water users' association. Deducting the surplus of \$8,310 leaves a total of \$79,690 to be reimbursed by the water users for this work, or an average of \$2.50 per acre as compared with \$2.75 per acre in 1924.

As a result of improvement in the distribution system, lessening seepage losses, and enabling a closer control to be maintained of the distribution of the water, the percentage of the water diverted from the river and delivered to the measuring boxes at the farms has been increased from 71.9 in 1920 to 77.9 in 1924.

On the Sunnyside division the deficit in 1920 amounted to \$13,372. This has been wiped out, the value of the inventories and equipment used for operation and maintenance, amounting to \$31,500, has been paid out of the operation and maintenance fund, and on December 31 the fund showed a surplus of \$16,592. It will not be possible, however, to consider reducing the operation and maintenance cost on this division this year, as the surplus will have to be used in the reconstruction of one of the major structures on the main canal, which can not longer be delayed.

On this division, as on the Tieton division, a great deal of betterment work has been done in installing new measuring boxes, replacing wooden structures on the lateral system with concrete, graveling banks, and rebuilding turnouts on the main canal, which has enabled the operating force to keep close control of the service, and thus improve the service to the water users.

The operation and maintenance work is carried on in close cooperation with the boards of directors of the districts and water users' associations, and these boards make occasional trips over the divisions for the purpose of familiarizing themselves with the work being done and the manner in which the distribution of water is being handled.

"Completeness of effort," which formed the basis of an article in the February issue of the NEW RECLAMATION ERA, describing the results attained on the Rio Grande project, has its counterpart on the Yakima project, where, at the meetings of Superintendent Lytel with the operating forces, effort is made to impress on the water masters, ditch riders, and maintenance crews that the organization exists solely for service and that effort must be made continually to improve it.

SMALL LANDHOLDINGS LEGISLATION IN DENMARK

Edwin C. Voorhies, of the University of California, who has spent the past year in the Scandinavian countries, writes this instructive description of the development of the small landholdings of Denmark

THE emigration from Denmark to America in the last third of the nineteenth and the first years of the twentieth century indicated to the Danish Government that something had to be done to keep some of the best of the population at home. The efforts in this direction are worth while noticing. In this brief presentation, however, only the salient features of the legislation will be mentioned.

The first legislation within recent times was the establishment in 1880 of two small holders' credit associations by the small holders themselves. The State itself encouraged the small holders with prizes for outstanding small farms, instruction in day and evening schools, voyages abroad, etc. Denmark still continues this work. For the year 1924-25 the sum of \$31,500 was appropriated for premiums for well-managed small farms, journeys for study, etc.

I. The problem, however, was to place people on the land, and the first act with this in view was adopted in 1899. This act, which aimed at placing farm laborers on the land, had a double purpose, (a) to improve the farm laborers' conditions by offering them easy access to land, (b) to provide the larger farms with additional labor. The law, however, was soon changed, (b) being left out of consideration.

The provisions of the law of 1909 were briefly as follows: 1. An appropriation of \$1,800,000 (\$360,000 a year for five years) for loans to farm laborers for the establishment of a small farm. 2. Farm's value (loan value) as a rule should not be above \$720. 3. Laborer had to have an amount equal to one-tenth of the farm's loan value. State furnished nine-tenths of the loan value. 4. Loan was to be paid off on exceptionally easy terms, interest 3 per cent. 5. Share was not to be less than 5 acres. 6. The farm was not to be burdened with further debt until balance due the State was 50 per cent of the original loan value. It is of interest to note the personality requirements of the settler: (a) Must be a citizen; (b) between 21 and 50 years of age; (c) must not be an ex-convict; (d) must not have used poor relief; (e) must have supported himself for at least four years in agricultural work since his eighteenth year; (f) recommendation from two known persons as to his integrity; (g) must have the means to come into full possession of farm applied for.

In 1901 a similar law to that of 1899 was passed with the following essential changes: 1. Loan of \$2,700,000 in five equal amounts. 2. Restriction to farm workers removed. 3. Loan value raised to \$900.

A new law in 1909 (1) appropriated \$3,600,000 (five equal amounts); (2) applicants' list widened to include unmarried women; (3) loan value raised to \$1,170 (\$1,440 in exceptional cases); (4) additional loans granted to owners under laws of 1899 and 1904 to obtain additional land or to make thorough ground improvements; (5) restrictions as to additional mortgage removed (No. 6 under 1899 law).

The 1914 law provided (1) \$900,000 a year for five years; (2) loan value increased to \$1,440 (\$1,800 in exceptional cases); (3) additional loans provided for former owners; (4) share reduced to 2.5 acres. In 1917, however, this law was changed since (1) the limit was again put back at 5 acres and (2) the loan value was raised to \$1,800 (\$2,160 in exceptional cases).

Two laws of 1921 and 1922 introduced important changes in the earlier laws. The most important were: 1. State appropriation put at \$2,160,000 yearly. On account of the high building costs a part of the loan could be a direct appropriation; (2) the amount of the loan value and State help were to be determined by the Minister of Agriculture and the Finance Committee of Parliament; (3) loan free of interest and of part payments for five years; interest charged after five years and payments made amounting to 5½ per cent yearly. For 1921-22 the loan value was put at \$3,960, of which 30 per cent could be yielded as a direct contribution and 60 per cent as a loan. For 1922 these figures were \$3,600, 15 and 75 per cent, respectively.

In all of the laws mentioned heretofore there have been regulations with reference to repairs, sale, etc. During the time 1900-1923 some 11,000 small farms have been established. The Government loans and contributions approximate \$13,680,000.

II. In the meantime another set of laws with small holdings in view has been passed. In 1919 two laws were passed, one providing for the setting up of farms on church lands and the other encouraging the sale of land from some of the large estates. It should be stated that in both of these cases the land becomes State property. This law stated (1) that farms were to be established of such size as was

suitable for the support of a family; (2) the buyer (applicant) should pay no cash sum but should pay interest on the land value, determined by current rates of interest and the value of the land determined by periodical valuations of the farm. In the latter case, however, no account was to be taken of the value increase brought to the land by the capital or labor of the farmer. The State therefore receives normal interest from the value of the land only. In order to erect the necessary buildings the State loaned nine-tenths of what it cost to have the farm ready for occupancy. Of this loan the first \$1,080 paid interest at 4½ per cent. The remainder of the loan was interest-free. After three years the entire building loan was to be paid off with 1 per cent yearly. A later law (March 29, 1924) raised the rent bearing payment from \$1,080 to \$1,440 and payments were to start in five instead of three years. With certain limitations the small holder obtains the deed to the farm, but should he wish to sell and this person is not his heir, the State has the right to withhold its consent to sell in order to prevent speculation. In addition to the church and estate lands the Minister of Agriculture was empowered (May 6, 1921) to purchase land for \$540,000 which was to be sold under the same conditions as the land from the church and estates. In connection with the series of laws just mentioned (church land, estate land, and public land) there have been established 1,827 farms between 1919 and 1923. The average size of these has been 17½ acres.

III. Related to these two series of laws (I and II) are the State loans to combinations of farmers who will buy larger farms and split them up for the use of small farmers. A law was adopted in 1909, repeatedly readopted and in 1921 there was appropriated a yearly sum for three years of \$36,000 for the support of these unions. At the close of 1923, 30 such unions were in existence of which 9 had received State help.

IV. It will be seen from the above that the State is directly concerned in the establishment of small farms in two main forms (I and II) or systems. It is proposed to see which system gives the best results. In order to make the systems more comparable, System I was changed in 1924. The new law contains the following salient features: (1) \$2,160,000 ap-

(Continued on page 43)

DEPARTMENT INSPECTION DIVISION

THE following self-explanatory order of the Secretary was issued on January 17, 1925:

ORDER

On August 1, 1924, an order was issued consolidating all investigating forces of the several bureaus of the Interior Department in the office of the Secretary under the general direction of a chief inspector, effective as of that date. The following supplemental instructions are now issued to define more fully the scope of the work of the division and the duties of inspectors:

1. The consolidated inspection division comprises the office of the chief inspector; the Field Service of the General Land Office; inspectors of the Bureau of Indian Affairs; special examiners of the Bureau of Pensions; inspectors of the Bureau of Reclamation; and such other employees as were or might be assigned in the several bureaus to perform duties such as are handled in the inspection division.

2. The titles used in the inspection division shall be:

- (a) Chief inspector;
- (b) Assistant chief inspector, who shall hereafter perform the duties of the Chief of Field Service, General Land Office, and such other duties as may be assigned;
- (c) Division inspectors, who shall hereafter perform the duties now performed by the field division chiefs, General Land Office.

DENMARK LANDHOLDINGS

(Continued from page 42)

propriated for each of three years; (2) State contribution is rescinded; (3) for building loans size the provisions under II go into effect. The loan in other words under the revised System I is divided into three parts, (a) land loan which amounts to nine-tenths of the purchase price; (b) the building loan \$1,440 bearing interest; (c) the remainder of the building loan which is not charged interest. The (c) must be paid off first.

It will be seen that the essential difference between the systems in effect now (January, 1925) is merely in the ownership of the land. Under II the farmer is what might be termed a permanent renter, the rent being determined by current conditions, whereas under IV (formerly I) the land is actually purchased by the farmer.

(d) Inspectors, who shall hereafter perform the duties now performed by the special agents, examiners, and similarly designated employees in the several bureaus of the department.

3. All matters which in the judgment of officials should be made the subject of special inquiry should be referred to the inspection division with a statement of the facts, together with the papers in the case and a request for a report.

4. The work of the inspection division is primarily constructive in nature. It was established for the purpose of simplifying, coordinating, and standardizing working methods in the bureaus of the department; to increase the usefulness of the various inspection agencies to the officers of the department in promoting uniformity, efficiency, and economy; in securing and reporting to these officers dependable information in matters upon which they must pass judgment, and aiding citizens by suggestion, advice, and information in their transactions with the department.

5. In addition to the foregoing duties, the inspection force is authorized to advise and cooperate with officers and employees, both in Washington and in the field, and inquire into complaints, if any, against supervisors and employees, and alleged violations of the law; suggest and recommend changes that will bring about improved service and working conditions; and such other work as is now carried on by the inspectors and agents of the several bureaus, only under differing titles.

6. In the performance of their duties, the attitude of inspectors should be courteous, helpful, and cooperative. They are agencies of the Government who can and should promote good will between it and the public which it serves. Their conduct should be such as to inspire the respect and confidence of the people in government business.

HUBERT WORK,
Secretary.

AMERICAN FALLS DAM CONTRACT AUTHORIZED

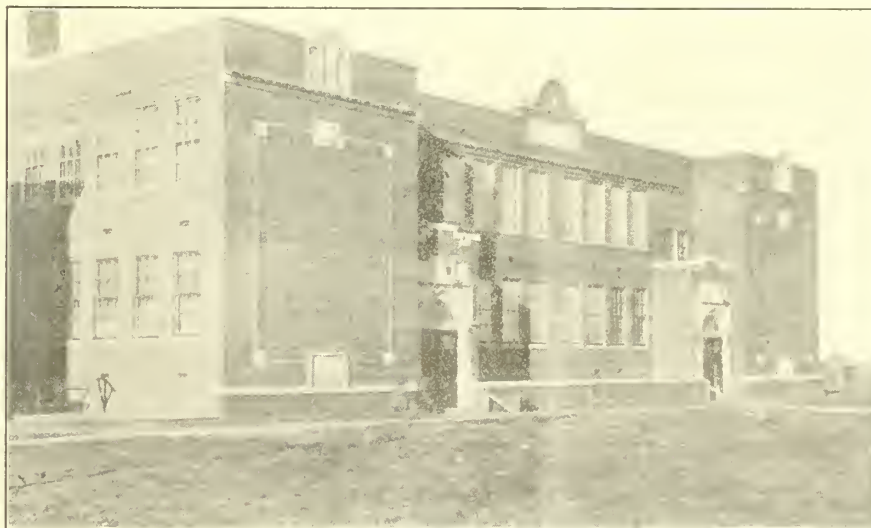
On January 23 the Secretary of the Interior authorized the Bureau of Reclamation to make award, enter into and approve a contract with the Utah Construction Co. for the construction of the American Falls dam at American Falls, Idaho.

Bids for the construction of the dam were opened at American Falls on January 22, and resulted as follows:

James O. Heyworth.....	\$1, 380, 000
Strange & Maguire.....	1, 354, 000
Atkinson & Atkinson.....	1, 319, 000
Utah Construction Co.....	1, 281, 000

The Utah Construction Co. was the low bidder, and the advisory board recommended the award of contract to that company on the basis of their bid as given above.

Sugar beet growers on the Minidoka project have formed an organization known as the Cassia County Beet Growers Association, with a view to securing cooperation among growers and with the sugar company, and to promote the best interests of sugar beet producers.



The new \$70,000 school building at Newell, Belle Fourche project, S. Dak.

CATTLE FED ON BALANCED RATION

As told in a recent issue of the Montrose Daily Press, cattle at the Holly sugar factory yards at Delta, on the Uncompahgre project, are fed upon a balanced ration and their condition and weight give evidence of the value of this method of caring for cattle.

Pulp and molasses from the factory form a part of this diet, combined with cottonseed cake and hay. The feeding of the cattle is a lengthy process. Starting at 7 o'clock in the morning to feed, the work is not completed until 5 o'clock in the afternoon. There are at present about 1,800 head of cattle of the Hereford and Shorthorn strains, and over 1,000 sheep. The cattle represent an investment of about \$150,000 and the sheep between \$12,000 and \$15,000.

For each steer between 100 and 125 pounds of beet pulp are used per day, together with 15 pounds of hay, 2 pounds

of molasses, and 1 or 2 pounds of cottonseed cake.

The molasses is poured over the beet pulp while hot and mixed in a 20-ton vat for the cattle. This is kept warm and fed warm. The vat was filled up first on December 19, and will be operated until the end of the feeding period.

Three thousand six hundred feet of track running from the pulp silo to the feed pens are used to carry feed to the cattle. On either side of the track are 1,800 feet of pulp line; and four lines, 3,392 feet in all, carry the hay to the steers. Sixty acres of land, all fenced in with woven wire, are used for the cattle. The sheep lots cover 6 acres and are also well fenced. The feed for the sheep is taken in with five teams which are used all the time.

The feeding was started September 25, when there were about 200 head of

stock. Feeding will continue until about the first of July.

During this period they will use at the yards between 80 and 100 tons of cottonseed cake, worth about \$5,500; 2,500 tons of hay, worth about \$27,000; between 150 and 200 tons of straw, oats, and bean chaff, which will cost about \$8,000; 350 tons of molasses, valued at over \$6,000. In addition to this expense the pay roll of the 12 men employed amounts to about \$1,100 a month or between \$8,000 and \$9,000 for the duration of the feeding period.

About 3,000 loads of manure, which accrue during the year, are given free of charge to beet growers who find it very profitable to haul during the winter for fertilizing their fields.

The work of feeding this stock is a big one and one which is important as it makes a market for hay and straw, as well as a large number of cattle. The proposition is one which the sugar company finds is worth while and profitable for them, and affords a way to dispose of their excess beet pulp and other by-products at a profit.

MINIDOKA SEED POTATO PRODUCTION

An average of \$333.80 per acre from seed potatoes raised on the Minidoka project, Idaho, is the record made by T. C. Gummerson, who lives on a project farm near Burley. This is a very creditable showing in view of the fact that there has been a large over-production of potatoes this year and potatoes have not been considered a very profitable crop. Good seed and good cultural methods, resulting in a high yield per acre of high quality potatoes, were responsible for the returns.

Mr. Gummerson's field consisted of 9 acres of Netteed Gems and 3 acres of Idaho Rurals. The seed used was Montana certified Russets and Idaho Rurals, which had passed the two field inspections for certification, and was grown by E. J. Konrad, of Heyburn.

From the 9 acres of Russets Mr. Gummerson sold 1,975 sacks of No. 1's, 259 sacks of No. 2's, and 50 sacks of culls, and has 80 sacks of No. 1 seed left for his own planting next year. This makes a total of 2,364 sacks, or an average of 262 sacks per acre. These potatoes brought Mr. Gummerson \$3,018.27.

From the 3 acres of Rurals, 664 sacks of No. 1's, 16 sacks of small selected seed, and 60 sacks of culls were sold, making a total of 740 sacks, or 246 sacks per acre.

These potatoes were also sold for seed and brought a total of \$987.36.

Summing up the totals for the 12 acres, Mr. Gummerson sold a total of 3,104 sacks of seed, which brought him



Field inspection of seed potatoes

\$4,005.63, or an average of \$333.80 per acre.

Although these potatoes were given more care than ordinary and were rogued during the season for undesirable plants, bringing the cost of production up considerably higher than average potatoes field grown for table stock, Mr. Gummerson still has a very nice profit left, over and above the cost of production.

NEW CHIEF CLERK FOR WASHINGTON OFFICE

Commissioner Mead has issued an order that, effective February 1, 1925, Charles N. McCulloch, former chief of the mails and files section, is designated chief clerk of the Washington office of the bureau and placed in supervisory charge of the mails and files, appointment, and stenographic sections of the office.

Mr. McCulloch succeeds J. B. Beadle, who resigned at the end of the year to accept a position in Philadelphia with the corporation of Brock & Weymouth, of which F. E. Weymouth, former chief engineer of the bureau, is president.

J. W. Myer, who has been employed in the mails and files section for a number of years, has been designated by the commissioner as chief of that section.

Four new cotton gins are being erected on the Rio Grande project, bringing the total number on the project to 29.

BRITISH SETTLERS GO TO CANADA

SUPPLEMENTING the brief article published in the January issue of the *NEW RECLAMATION ERA*, the following additional information is available concerning the agreement under which 3,000 British agricultural families are to be placed on the land in Canada:

The Canadian Minister of Immigration and Colonization has entered into negotiations with the Imperial Government and concluded an arrangement whereby 3,000 families are to be sent to Canada for placement on farms. These families, strictly of the agricultural type, are without the ready means to defray their transportation expenses, equip their farms, and maintain themselves until they will be getting results from their farming operations, and to tide them over this period the British Government has set apart the sum of \$4,500,000 to be advanced as loans, to be fixed according to the needs of the families and applied among other things to the purchase of farm equipment, etc. The loans will vary in amount and it is anticipated that they will average about \$1,500 per family, to be repayable over 25 years.

The farms on which these families are to be established are located in the various Provinces and are owned by the Federal

Government, and the endeavor will be, in so far as possible, to place the families in the particular Provinces for which they may have a preference, at the same time keeping in mind the vital question of where the settler will most likely succeed.

None but bona fide agriculturists actually resident in the British Isles and coming to Canada to follow agricultural work are eligible for assistance under this plan and no loans will be arranged until the families are finally approved by officers of the Canadian department. The work of selection has been in progress for the past two months and the first of the arrivals are expected in the early spring. The Land Settlement Branch will supervise the placing of the incomers and also be at their service at any time to advise and otherwise aid them to overcome any difficulties that may arise. It is believed that with reasonable endeavor on their part the settlers will meet with success.

The idea is to place the head of each family at farm employment for a year in the district where he is to be located, thus giving him an opportunity to thoroughly acquaint himself with Canadian farming methods and reduce the possibility of his proving a failure. It was at first thought that three years would

elapse before the quota of 3,000 would be exhausted, but there is every indication that the entire number will come forward in two years.

COOPERATIVE MARKETING ON SHOSHONE PROJECT

The Big Horn Basin Cooperative Marketing Association, with which the Park County, Wyo., Farm Bureau Federation is affiliated, sold during 1924 \$171,000 worth of farm products, including poultry, beans, sweet clover, and alfalfa seed for the farmers of the Big Horn Basin. Of this amount the business from the Shoshone project totaled about \$25,500. In addition, the association disposed of about half a car of turkeys and \$8,000 worth of sweet clover seed early in 1925.

Leo L. Werts, the local representative of the association from the Shoshone project, outlines some of the advantages of the association as follows:

They deal with large responsible firms, thereby reducing the overhead expense, and receive maximum returns for their products.

Through cooperation the control of selling is democratic.

The association is governed by a grower board of directors.

The nonstock plan prevents a small number from obtaining control.

Nonprofit plan makes each grower's interest identical.



Lower Yellowstone dam, Lower Yellowstone project, Montana-North Dakota

PUBLIC LAND SALES SHOW DECREASE

ACCRETIONS to the reclamation fund come in part from receipts from the sale of public land. Of interest, therefore, to the Bureau of Reclamation is a recent statement by the Department of the Interior showing that such receipts have fallen off approximately 85 per cent during the last 20 years.

The tabulation shows that such receipts declined from approximately \$8,795,000 during the fiscal year 1904 to \$1,235,000 for the fiscal year 1924. This represents a decrease of approximately \$7,560,000.

The biggest loss in receipts from the disposal of public lands during the last 20 years occurred in cash sales. In 1904 the General Land Office realized approximately \$7,445,000 from cash sales on the public domain, whereas last year the amount received from cash sales was only \$551,000. Fees and commissions on public lands disposition 20 years ago was \$1,349,990. During the fiscal year 1924 these fees and commissions declined to \$684,650.

The tabulation also shows that notwithstanding the fact that the receipts from the disposal of public lands have fallen off approximately 85 per cent during the last 20 years, the number of local land offices maintained by the Government throughout the country has been reduced only 27½ per cent. In the fiscal year 1904 the total number of local land offices was 116. During the last fiscal year there were 84 local land offices, or a reduction of 32.

Responsibility for the heavy loss in the public-land business of the Government is due to the fact that virtually all the raw public lands worthy of cultivation and capable of producing a livelihood for a family have already been taken up by homesteaders. The remaining area still the property of the Nation is therefore not attractive for homesteading purposes.

An evidence of this is found in the number of homestead entries filed on the public domain during the last fiscal year as compared with 20 years ago. In 1904 there were 69,175 homestead entries covering a total of 10,171,265 acres of public lands. For the fiscal year 1924, the number of homestead entries had dwindled to 13,886 covering 3,873,172 acres.

Homestead entries have been falling off at the rate of approximately 2,750 annually during the last 20 years.

The approximate area of the present unreserved public domain amounts to

186,000,000 acres not including the Territory of Alaska. This area represents what is left after 100 years or more of picking by hundreds of thousands of pioneers, who have been going west to build homes and to make fortunes for themselves and their families. Some of this remaining land is arid and semi-arid, requiring irrigation before being tenantable; other portions are located on steep mountain slopes which have not

even been surveyed. The soil is stony and sandy, making agricultural development an undertaking so expensive and burdensome that a homesteader would not be able to make a living from it.

Receipts from the sale of public lands, including fees and commissions, for the quarter ending December 31, 1924, that have been credited to the reclamation fund, amounted to \$205,051. The accompanying list shows the amounts credited to the fund, by States:

Arizona.....	\$7,263	New Mexico.....	\$17,372
California.....	57,897	North Dakota.....	634
Colorado.....	20,871	Oklahoma.....	892
Idaho.....	12,577	Oregon.....	14,423
Kansas.....	88	South Dakota.....	2,711
Montana.....	19,144	Utah.....	12,727
Nebraska.....	774	Washington.....	8,748
Nevada.....	3,159	Wyoming.....	25,766



A view of an irrigated section of the Uncompahgre project, Colo.

OFFERS OF AID FOLLOW YUMA FIRE

THE headquarters office of the Bureau of Reclamation on the Yuma irrigation project, Arizona, at Yuma, the Yuma County Water Users' Association building and an engine shop adjoining were totally destroyed by fire on January 24. Only the old adobe walls of the buildings were left standing, and the adjoining locomotive and equipment shed of the bureau was badly damaged by the flames and water. The Yuma fire department did yeoman service in fighting the fire, and, with the assistance of hundreds of volunteer workers, saved thousands of dollars worth of office furniture, equipment, and records.

The utmost cooperation in meeting the situation was shown by the citizens of Yuma. Among others, the Yuma Light,

Gas & Water Co., the Southwestern Ice & Manufacturing Co., the Imperial Irrigation district at Andrade, and the Southern Pacific shops have all offered the use of their shop facilities to the bureau. The city of Yuma offered the use of the city building for temporary offices, and E. F. Sanguinetti offered the use of his equipment and organization for any purpose that might be helpful. The district engineer of the Geological Survey at Tucson loaned the project surveying instruments until the stock can be replaced from the Washington and Denver offices.

Commissioner Mead is especially gratified at the many offers of aid and the helpful spirit of cooperation which have made easier the meeting of a trying situation.

COOPERATIVE RESULTS IN DENMARK

IMPROVED agricultural methods in Denmark, the result of cooperation, as told in Department Bulletin 1266 of the Department of Agriculture, have changed that country in one generation from a land of tenant farmers to a condition in which 92 per cent of the people own the land which they farm. Cooperative operations in connection with the production and marketing of butter, eggs, and bacon are on a specially high plane of efficiency.

Denmark stands to-day as the world's foremost country in scientific organization in production and marketing. The country has neither extreme wealth nor extreme poverty. As a result of cooperative methods the Danish farmers to-day face the world markets as one collective body of sellers rather than as 205,000 individual farmers.

Although the soils of Denmark do not compare in richness with those of the agricultural centers of the United States, the productivity of the soil has been increased greatly during the last 50 years by scientific culture and treatment and by application of barnyard manure.

The geographical situation between the densely populated industrial countries of northern Europe and Great Britain has been an important factor in this development of markets for the products of Denmark.

Seventy-eight per cent of the total area of Denmark is agricultural land and 66

per cent of the total land area is under actual cultivation. The country is now a land of middle-sized and small farms. Approximately 100,000 of these farms have an average area of 50 acres; another 100,000 have about 20 acres; and the other 5,000 of the 205,000 farms are State farms larger than 150 acres in size.

COOPERATION

*You have a dollar,
I have a dollar.*

We swap.

*Now you have my dollar,
And I have your dollar.
We are no better off.*

*You have an idea,
I have an idea.*

We swap.

*Now you have two ideas,
And I have two ideas.
Both are richer.*

*What you gave you have,
What you got I did not lose.
This is cooperation.—Exchange.*

The small holder, with a few acres, usually works a part of the time on the larger farms in the neighborhood, and the trend during the last decade or two has been to make the small holdings of suffi-

IDAHO SEED GROWERS WIN MANY PRIZES

Idaho seed growers on irrigated land made a remarkable showing at the recent international grain and hay show in Chicago. In a class of 70 competitors, Idaho red clover seed took first, second, third, and all other prizes down to and including fifteenth prize, with the exception of the twelfth.

First place was won by John D. Remsberg of Rupert. Five winners live in Buhl and four in Emmett; others are in Aberdeen, Caldwell, Burley, and Eagle.

Idaho took first on alsike clover, exhibited by R. M. Cruse, of Emmett, and first on Trebi six-rowed barley, by Ed. Moser, of Aberdeen, among 54 competitors.

In this connection it is interesting to note that the Owyhee and Vale lands are not remote nor different from the seed-growing area of Idaho.

ent size to maintain a family without necessitating outside work.

An official investigation of the Danish Statistical Department on the trend of farm ownership showed that tenancy in Denmark decreased from 42 per cent in 1850 to 10 per cent in 1905.

One of the important factors in the success of the cooperative movement has been the standardization of brands of products marketed. The butter has a standard "Lur Brand," and standard tests are made of the butter. If the standard is not maintained, this brand is refused to the creamery until the standard is again raised sufficiently to satisfy the requirements.

SUGAR-BEET GROWING ON LOWER YELLOWSTONE

The accompanying illustration shows Mr. G. E. Gowy, of Sidney, Mont., on the lower Yellowstone project, standing in his 140-acre field of sugar beets, "two years from foxtail."

Mr. Gowy states that he purchased this land in 1920 and for four years did not produce 50 cents an acre on account of its being water-logged and alkali. In 1922 he tilled the land and sowed it to grain in 1923. The grain was mowed for feed and in the fall of that year the land was plowed. In the spring of 1924 the ground was double disked and planted to sugar beets.

Mr. Gowy harvested a crop of beets that averaged 12 tons per acre and brought a gross return of \$100 per acre. "This," he says, "shows what draining will do on seeped land."



Two years from foxtail to sugar beets on the Lower Yellowstone project

IRRIGATION WILL HELP PER CAPITA PRODUCTION

That the development of new irrigation areas is in the nature of an economic necessity is indicated by data recently prepared by the Department of Agriculture, which show that crop production in the United States is not keeping pace with the annual increase in population. During the past 12 years the production per capita has decreased about 5 per cent.

As measured by an index number, with 100 representing the average for the five-year period 1910 to 1914, the index of crop production per capita in 1924 was only 95 per cent of the average and in 1923 only 94 per cent. The trend of crop production per capita has been lagging since 1915, with the exception of 1920.

In this connection it will be recalled that in a recent statement President Coolidge pointed out that "some minor criticism has been made as to the policy of our unrelenting development of these projects by those who have thought we were already overproducing in agricultural products. They feel that these projects should be stayed until agricultural production has readjusted itself. These criticisms lie in the lack of understanding that these projects take many years for development, that they furnish but a small portion of the total increased food supply required even by our increase in population, that the utilization of their supplies lies in the development of the West itself. A country growing so fast in population as is our own can not limit its considerations to immediate necessities. Many people now living will see this a country of 200,000,000 inhabitants."

PROJECT BOOKLET WILL HAVE FULL INFORMATION

The Bureau of Reclamation has prepared an illustrated booklet of some 60 pages descriptive of the irrigation projects of the bureau, giving general information for prospective settlers and a plain statement of facts concerning the opportunities offered on each of the projects. This booklet is now being printed and should be available within a short time.

This will be used generally by the division of reclamation economics in Denver and the division of settlement and economic operations in Washington in furnishing reliable information concerning the projects and their opportunities to those interested.

Later on it is planned to issue special booklets, each covering only a single project, if the scheme can be developed of financing the cost through local contributions, the bureau furnishing the necessary illustrations and passing upon the text so that the statements contained in the booklets will be vouched for by the Federal Government.

In this connection it is hoped that all project organizations, such as water users' associations, irrigation districts, chambers of commerce, boards of trade, organizations of producers of special crops, sugar-beet companies, railroads, and others having the interests of the projects at heart will send to the bureau from time to time information which may be helpful in furnishing prospective settlers full and reliable data concerning opportunities on the projects.

Additional settlers are needed on virtually all the projects, and the bureau

YAKIMA VALLEY CROPS WORTH \$36,563,047

C. A. Foresman, writing for the Yakima Herald, presents a statement which shows that, measured by gross returns, the total value of crops grown in the Yakima Valley in 1924 was virtually the same as that of 1923, a record year for tonnage production. The gross value in 1924 was \$36,563,074, as compared with \$36,696,117, the estimated value of the 1923 production. Mr. Foresman predicts, however, that when the present storage is marketed the 1924 crop will have returned more money to the valley than was finally returned by the 1923 crop.

The statement shows that 8,500 cars of apples were produced, of which 4,500 cars were shipped, valued at \$5,551,500; and 4,000 cars stored, valued at \$6,804,000. Of the 6,000 cars of potatoes grown, 58,500 tons were shipped, valued at \$1,170,000; and 49,500 tons were stored, valued at \$1,237,500. Alfalfa showed a production of 15,000 cars, of which 6,000 cars, or 84,000 tons, were shipped, valued at \$1,134,000; 9,000 cars, or 116,000 tons, were stored, valued at \$1,798,000; and 10,000 tons were fed to stock in transit, valued at \$80,000. Of the dairy products, cream amounted to 1,870,000 pounds, valued at \$317,900.

wishes to work with the local organizations in every way to secure the right kind of settlers to fill the vacancies and to see that the information furnished these prospective settlers is reliable and trustworthy in every respect.



This bunch of mortgage lifters on the Carlshad project is resting after strenuous efforts to take on flesh in the interest of their owner

NEW RECLAMATION ERA

VOL. 16

APRIL, 1925

NO. 4



IRRIGATED CABBAGES ON THE KLAMATH PROJECT, OREGON—CALIFORNIA

The Farmer

*THE politician talks and talks, the actor plays his part;
The soldier glitters on parade, the goldsmith plys his art.
The scientist pursues his germ o'er the terrestrial ball,
The sailor navigates his ship, but the farmer feeds them all.*

*The preacher pounds the pulpit desk, the broker reads the tape;
The tailor cuts and sews his cloth to fit the human shape.
The dame of fashion, dressed in silk, goes forth to dine or call,
Or drive, or dance, or promenade, but the farmer feeds them all.*

*The workman wields his shiny tools, the merchant shows his wares;
The aeronaut above the clouds a dizzy journey dares.
But art and science soon would fade, and commerce dead would fall,
If the farmer ceased to reap and sow, for the farmer feeds them all.*

*—Representative Hampton P. Fulmer of South Carolina,
in the Congressional Record of February 25, 1925.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

APRIL, 1925

No. 4

CONFERENCE IN CHICAGO WITH RAILROAD OFFICIALS

Settlement agents of the various railroads whose lines serve the projects meet with Secretary Work and Commissioner Mead to discuss coordination of activities in the interest of successful project development

A PREREQUISITE to the successful development of new projects and the rehabilitation of those already constructed is a definite understanding and organized cooperation between the Bureau of Reclamation, State governments, railroads, and agricultural and commercial organizations. All of these organizations have the interests of the projects and of the settlers at heart, but not all are working most efficiently to attain the best results. A coordination of the various activities is the first step to be taken.

The above statement outlines the reason which prompted Commissioner Mead to suggest a conference in Chicago on March 19 of representatives of the settlement and development departments of those railroads whose lines serve the irrigation projects. The response to Doctor Mead's invitation was wholehearted and enthusiastic, and as a result the following were in attendance:

Northern Pacific.—John W. Haw, agricultural development agent, St. Paul; E. F. Benson, agricultural development agent, Seattle; W. P. Stapleton, agricultural development agent, Seattle.

Great Northern.—E. C. Leedy, general agricultural development agent, St. Paul; W. S. Weber, general agricultural development agent, Chicago.

Union Pacific.—R. A. Smith, superintendent of agriculture, Omaha.

Southern Pacific.—C. T. Collett, general agent, Chicago; G. A. Thiess, traveling agent, Chicago.

Chicago, Burlington & Quincy.—J. B. Lamson, agricultural development agent, Chicago; Val E. Kuska, colonization agent, Omaha.

Atchison, Topeka & Santa Fe.—C. L. Seagraves, general colonization agent, Chicago.

Chicago, Milwaukee & St. Paul.—H. F. Hunter, general agent, Chicago.

Denver & Rio Grande Western.—Represented by Mr. Lamson of C., B. & Q.

Chicago & North Western.—George Bonnell, industrial agent, Chicago.

Others in attendance at the conference were Miss M. A. Schnurr, secretary to Commissioner Mead; H. A. Brown, chief of the division of settlement and economic operations, of the Washington office of the bureau; and W. J. Donald, executive assistant to Secretary Work.

STATE COOPERATION IN SETTLEMENT

Commissioner Mead has written to the governor of each of the States of Montana, Nevada, Oregon, and Washington, calling their attention to the appropriations in the Interior Department appropriation act for the fiscal year 1926 for continuing construction on the Sun River, Spanish Springs, Vale, and Kittitas, projects; and in particular to the provisions requiring or encouraging cooperation between the Federal and State governments in the development of new projects.

The meeting was opened by Doctor Mead, who stated that he had asked the representatives of the railroads to meet with him as a start toward teamwork in agricultural settlement and development, teamwork in which it was hoped to enlist as cooperators the States, the banks, the commercial bodies, and, above all, the railroads, pointing out that the representatives of the railroads, more than anybody else, understand colonization, its problems, and the means of securing settlers. Doctor Mead then introduced Secretary Work, who addressed the meeting, in part, as follows:

"We are interested in developing Federal reclamation and to do this we must get settlers on the land. You people, I take it, are interested in carrying freight to and from this land and so, assuming that that is a problem of Federal reclamation which can not be made to succeed

unless these people are properly selected, our relations then are in common interest, to protect Federal reclamation which in turn will do business with the railroads. I can readily see where there will be quite close relations. I think the conception of this meeting is a most fortunate one.

"If Doctor Mead will excuse a personal reference, I might say to you—maybe you have not realized it—that Doctor Mead is the keystone of the new policy of Federal reclamation.

"Last fall, a year ago, I instituted what we called the fact-finding committee. The personnel of that committee comprised five of the ablest men in the United States. They spent most of the winter analyzing reclamation from the beginning and recommended the establishment of a new policy which was submitted to Congress in the form of a bill, and it was enacted with slight modification. We are trying to save Federal reclamation under that new law.

"The records show that it takes three generations of people to settle this country, but it is pretty hard on the first two generations. That is where the judgment of you men in the selection of settlers is of most importance—the selection of the type of people to put on the farms. The crux of the settlement plan is to appraise a project, fix a price, a reasonable price such that a reasonably experienced, industrious farmer can take a farm on that project, make a living from the land, and pay back the Government. It is a very simple proposition when it is reduced to cold facts.

"With the cooperation of you men in the selection of settlers we can secure the right kind of farmers to go on there with reasonable expectations to develop this land, pay the Government back in reasonable time the money expended, and finally own their own homes."

Doctor Mead then pointed out that the reclamation projects under construction,

(Continued on page 50)

OFFICIAL INTERPRETATION OF NEW LEGISLATION

The following is a continuation of the interpretation of certain provisions of the fact-finders act of December 5, 1924. The interpretation of other provisions will be found in the March issue of the New Reclamation Era

UNDER date of January 28 the Secretary of the Interior approved the interpretation of certain provisions of section 4 of the act of December 5, 1924. For the information and guidance of readers of the NEW RECLAMATION ERA we are printing below the official interpretation, approved by the Secretary on March 19, 1925, of additional provisions of the act.

Subsection G provides as follows:

That whenever two-thirds of the irrigable area of any project, or division of a project, shall be covered by water-right contracts between the water users and the United States, said project shall be required, as a condition precedent to receiving the benefits of this section to take over, through a legally organized water-users' association or irrigation district, the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as the Secretary may prescribe, and thereafter the United States, in its relation to said project, shall deal with a water-users' association or irrigation district, and when the water users assume control of a project the operation and maintenance charges for the year then current shall be covered into the construction account to be repaid as part of the construction repayments.

It is necessary to construe the word "benefits" to determine the other subsections of the act to which subsection G is applicable. A strict, literal interpretation of this subsection, taken alone, would lead to the conclusion that all subsections of the act from F to R are qualified by subsection G.

However, it is to be remembered that this is a remedial statute and under the rules of statutory construction a liberal interpretation must be given of the act as a whole with a view to giving effect, if possible, to each provision. It is believed that a possible and reasonable construction is that the "benefits" mentioned in subsection G are those only which flow from the execution of the mandatory contracts, that is, those provided for in subsection F immediately following, which require some affirmative action on the part of the water user, and that it has no application to the other provisions of the act, which appear to be more general in character, and do not require the execution of amended contracts to make them effective. The other provisions are self-executing. It is believed that subsection

G means merely that if application is made for any of the benefits depending upon execution of contract and two-thirds of the irrigable area is under water-right application, the Secretary shall require as a condition precedent that the operation and maintenance of the project or the division affected shall be taken over by the water users.

Had it been intended that subsection G should qualify the other provisions of the act, this subsection should have been placed at the end or following the clauses intended to be qualified. The position alone of course is not controlling, but has a proper place in the construction of the act. Moreover, subsection I provides expressly that the benefits of that subsection shall be applicable only after the operation and maintenance of constructed works is taken over. This is unnecessary and superfluous if subsection G already limits the application of all the other subsections. Specific mention in this subsection seems to negative the idea of applicability to all subsections.

(Continued on page 51)

CONFERENCE WITH RAILROAD MEN

(Continued from page 49)

and for which surveys have been authorized, will involve an expenditure for construction of works, for movement of settlers, and development of farms that makes transportation a matter of vital importance. Settlers are needed on all the old projects. Settlers are needed for land in excess ownership, land controlled by absentee owners, who either have left it idle or have rented to tenants; land which the present owners would be glad to sell with a view to moving to some other locality.

To people the new projects will require nearly 9,000 settlers. To fill the gaps on old projects will require an equal number.

It was shown that to equip and improve 40 to 80 acres of land for farms under irrigation will cost not less than \$5,000 to \$7,000. This will be used to clear off the sage brush, build fences, provide for plain equipment in the way of buildings for the family and the livestock, and enable the settler to live during the year in which his work must be largely unproductive.

Statistics gathered by the California State Land Settlement Board showed

about four prospective settlers with less than \$1,500 for every one with that or more capital, and about five times as many applied for farm laborers' allotments, for which the minimum requirement was \$300, as applied for farms where they had to have \$1,500 or more.

A recent study of data furnished by prospective settlers on the projects of the Bureau of Reclamation showed that 70.9 per cent had only \$1,500 or less; 18.6 per cent between \$1,501 and \$2,500; and only 10.5 per cent more than \$2,500. These facts seem to show that a large part of the settlers will have to borrow part of the money needed to make their farms going concerns.

Attention was directed to the Kendrick-Winter bill providing for aid in the settlement of Government land in irrigation projects. This bill was favorably reported by both the House and Senate Committees on Irrigation and Reclamation, but failed to pass for lack of time. It provided also Government loans for permanent improvements and for the purchase of livestock, the maximum advance

permitted being \$3,000. The ultimate passage of this or a similar bill will mean the blazing of a new trail and a radical departure from the ideas and practices which have prevailed from the time the wave of western settlement crossed the Alleghenies.

Another matter referred to by Doctor Mead was that of cooperation with the States, and it was noted that the Interior Department act for the fiscal year 1926 recognizes the fact that there is an obligation on the part of the State as well as the Federal Government in the successful development of these projects, through selection of settlers and furnishing them advice and financial assistance.

The meeting was noteworthy in forming the basis for a mutual understanding of the settlement problems confronting the railroads and the irrigation projects; in stressing the need for coordinated effort on the part of all interested in these problems; in bringing prominently to the attention of all the necessity for careful selection of settlers, their financial requirements, and the aid and direction which they should receive after being placed on a project; and in developing the need for spur lines to meet the requirements of the settlers in marketing their products.

Literal interpretation of subsection G would apparently prevent anything being done under subsection K except where operation and maintenance has been taken over under the two-thirds rule. This is certainly true if what has been therein authorized is to be called a "benefit." While further action by Congress is necessary before any charges may be remitted or adjustment made under subsection K, it would seem that the survey and report authorized to be made, manifestly with the expectation that Congress will authorize reductions, reallocations of charges and other adjustments, constitute a benefit; in fact, no doubt this is regarded by many projects and water users as the outstanding benefit of the act. It would seem that any interpretation which would prevent survey and report under subsection K, regardless of operation and maintenance being turned over, would defeat in large measure the relief manifestly sought to be extended. Such construction being absurd, should not be adopted.

A strict, literal interpretation of subsection G, standing alone, would likewise make it necessary to withhold the benefits of subsections M and Q, having only purely personal application. The bureau has had already applications for exchange of entries under subsection M from projects, the operation and maintenance of which has not been taken over. These must be denied if subsection G is applicable to such cases. Such literal interpretation would necessarily split the Washington office expense under subsection O, certain projects bearing their proportionate part of the expense after June 30, 1925, and others being exempt from such expense, dependent upon their status, which would be fluctuating. For example, against projects not open and those not having two-thirds of the irrigable area under water-right application, no expense would be chargeable on account of the Washington office. However, immediately they reach the time when two-thirds of the irrigable area is under water-right application they would begin paying and continue paying until such time as operation and maintenance shall be taken over, whereupon they would again cease paying. It would seem that had it been intended that the Washington office expense should be thus divided an arbitrary date, as June 30, 1925, would not have been selected, without some qualification and more definite connection with subsection G.

The cost of general investigations made before and after date of the act are, under subsection O, to be charged to the reclamation fund and shall not be

charged as a part of the construction or operation and maintenance payable by the water users of the projects. There is no practical way in which effect may be given to this provision if it is to be dependent upon the transfer of operation and maintenance to the water users. Such investigations can be in nowise affected by the matter of operation and maintenance. Apparently the only possible difference would be the time credit may be applied, as sooner or later the operation and maintenance of all projects must be taken over under the law. Hence there is no possible reason for applying subsection G to this item.

It is believed that the construction that subsection G qualifies only the provisions of subsection F (and L, which is dependent upon contract adjustment under F) is a reasonable and proper one. That it will be attended with fewer complications than any other must be conceded. The accounting will be thereby greatly simplified and the expense lessened. On the whole the administration of the act will be made much easier. Any doubt that may exist in the respects mentioned should be resolved in favor of the water user. Any other interpretation than that here suggested would work great inequality, lead to much confusion, and would defeat in part the intention of Congress.

ECONOMIC SURVEY BASIS OF LAND SETTLEMENT

Dr. Richard T. Ely, in a recent address before the National Fertile Land Conference, stated that honesty and fairness in dealing with our frontier settlers necessitates solving the problem of land utilization, and in this connection he pointed out the need of the economic land survey and the certification of land, as well as the importance of cost and income researches, to the end that losses not only in our economic but in our human resources may be decreased.

"If in land settlement we are to have a square deal for the individual and the Nation we must have a planned-out settlement along with economic survey. We must aim at the closer settlement of land, because scattered settlements involve heavy expenditures for all social and economic purposes. Schools cost more, as do all the conveniences and amenities of life; for example, roads, and other public utilities. We want the rural population to be the best possible, and where the settler does not have a square deal, we have a depreciation of human values."

REGULATIONS UNDER SUBSECTION H

These regulations are urgently needed because of payments which are maturing and being made. There exists some uncertainty regarding the amount of penalty which shall be charged and collected.

The subsection provides that a penalty of 1 per cent per month against delinquent charges prescribed in sections 3 and 6 of the reclamation extension act is reduced to one-half of 1 per cent per month as to all installments which may become due after the passage of the act. It has been suggested that this subsection is qualified by subsection G of the same act already discussed. The contention is made by some that where the project has been opened and two-thirds of the irrigable area is covered by water-right contracts, the reduction of penalty will apply only after the operation and maintenance has been taken over as provided in subsection G.

It is not believed that it was the intention of Congress to penalize an individual water user or withhold a benefit on account of something for which he is in nowise to blame and over which he has no possible control; but rather that Congress intended to reduce the penalties named on all installments subsequently accruing without regard to whether the operation and maintenance of the project, or the division of it affected, has been taken over.

The language makes this subsection applicable to all installments which may hereafter become due. This is true without regard to whether the operation and maintenance of the project or division has been turned over as provided in subsection G of the same act.

Subsection H is applicable likewise to rental charges fixed under section 11 of the reclamation extension act of August 13, 1914 (38 Stat. 686), which provides that such charges shall be subject to the same penalties as provided for other operation and maintenance charges.

All charges other than those specifically mentioned in these regulations will be governed, as heretofore, by the contracts or provisions of law applicable.

Penalty of 1 per cent per month as provided by the reclamation extension act will be charged against all installments becoming due prior to December 5, 1924, until paid, except, of course, when such penalty is modified by some of the various relief acts. On all installments becoming due after December 5, 1924, the penalty provided by subsection H will apply.

The importance of having men with business capacity to head up cooperative organizations can not be overestimated.

RECENT FEDERAL IRRIGATION LEGISLATION

The appropriation act for the Bureau of Reclamation and other enactments concerning the irrigation of arid lands in the West, including the fact-finders bill

BUREAU OF RECLAMATION

THE following sums are appropriated out of the special fund in the Treasury of the United States created by the act of June 17, 1902, and therein designated "the reclamation fund," to be available immediately:

For all expenditures authorized by the act of June 17, 1902 (Thirty-second Statutes, page 388), and acts amendatory thereof or supplementary thereto, known as the reclamation law, and all other acts under which expenditures from said fund are authorized, including personal services in the District of Columbia and elsewhere; examination of estimates for appropriations in the field; refunds or overcollections hereafter received on account of water right charges, rentals, and deposits for other purposes; printing and binding, not exceeding \$25,000; purchase, maintenance, and operation of horse-drawn or motor-propelled passenger-carrying vehicles; payment of damages caused to the owners of lands or private property of any kind by reason of the operations of the United States, its officers or employees, in the survey, construction, operation, or maintenance of irrigation works, and which may be compromised by agreement between the claimant and the Secretary of the Interior; and payment for official telephone service in the field hereafter incurred in case of official telephones installed in private houses when authorized under regulations established by the Secretary of the Interior: *Provided*, That no part of said appropriations may be used for maintenance of headquarters for the Bureau of Reclamation outside the District of Columbia except for the office of the chief engineer:

Salt River project, Arizona: For examination of project and project accounts, \$5,000;

Yuma project, Arizona-California: For operation and maintenance, continuation of construction, and incidental operations, \$432,000: *Provided*, That the unexpended balance of the \$250,000 authorized in the act approved June 5, 1924, for the construction of a hydroelectric power plant at the siphon drop on the main canal is reappropriated for the fiscal year 1926 and made available for the same purpose and under the same conditions as provided in said act;

Orland project, California: For operation and maintenance, continuation of construction, and incidental operations, \$34,000;

Grand Valley project, Colorado, including Orchard Mesa division: For operation and maintenance, continuance of construction, and incidental operations, \$278,000;

Uncompahgre project, Colorado: For operation and maintenance, continuation of construction, and incidental operations, \$163,000;

Boise project, Idaho: For operation and maintenance, continuance of construction, and incidental operations, \$139,000: *Provided*, That the expenditure for drainage shall not exceed the amount

paid by the water users pursuant to the provisions of the Boise public notice dated February 15, 1921, except for drainage in irrigation districts formed under State laws and upon the execution of agreements for the repayment to the United States of the costs thereof;

King Hill project, Idaho: For operation and maintenance, continuation of construction, and incidental operations, \$35,000;

Minidoka project, Idaho: For operation and maintenance, continuation of construction, and incidental operations, \$797,000;

Huntley project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$118,000;

Milk River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$76,000;

Sun River project, Montana: For operation and maintenance, continuation of construction, and incidental operations, \$611,000: *Provided*, That no part of this appropriation shall be used for construction purposes until a contract or contracts in form approved by the Secretary of the Interior shall have been made with an irrigation district or with irrigation districts organized under State law, providing for payment by the district or districts as hereinafter provided. The Secretary of the Interior shall by public notice announce the date when water is available under the project: *Provided further*, That no part of the sum hereby appropriated shall be expended for the construction of new canals or for the extension of the present canal system for the irrigation of lands outside of the forty thousand acres for the irrigation of which a canal system is now provided, until a contract or contracts shall have been executed between the United States and the State of Montana, whereby the State shall assume the duty and responsibility of promoting the development and settlement of the project after completion, securing, selecting, and financing of settlers to enable the purchase of the required livestock, equipment, and supplies and the improvement of the lands to render them habitable and productive. The State shall provide the funds necessary for this purpose and shall conduct operations in a manner satisfactory to the Secretary of the Interior: *Provided further*, That the operation and maintenance charges on account of land in this project shall be paid annually in advance not later than March 1, no charge being made for operation and maintenance for the first year after said public notice. It shall be the duty of the Secretary of the Interior to give such public notice when water is actually available for such lands;

Lower Yellowstone project, Montana-North Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$180,000.

North Platte project, Nebraska-Wyoming: For operation and maintenance,

continuation of construction, and incidental operations, \$510,000: *Provided*, That any unexpended balance of any appropriation available for the construction of the Guernsey Reservoir and incidental operations for the fiscal year 1925 shall remain available for such purposes during the fiscal year 1926: *Provided further*, That all net revenues from any power plant connected with this project shall be applied to the repayment of the construction costs incurred by the Government on this project until such obligations are fully repaid;

Newlands project, Nevada: For operation and maintenance, continuation of construction, and incidental operations, \$167,000, together with the unexpended balance of the appropriation for this project for the fiscal year 1925, of which amount \$245,000 shall be used for drainage purposes, but only after execution by the Truckee-Carson irrigation district of an appropriate reimbursement contract satisfactory in form to the Secretary of the Interior, and confirmation of such contract by decree of a court of competent jurisdiction and final decision on all appeals from such decree;

Newlands project, Spanish Springs division, Nevada: For continued investigations, commencement of construction, and necessary expenses in connection therewith, \$500,000: *Provided*, That no water shall be delivered to irrigators on this division outside of the limits of the Truckee-Carson project until a contract or contracts in form approved by the Secretary of the Interior shall have been made with an irrigation district or with irrigation districts organized under State law providing for payment by the district or districts as hereinafter provided: *Provided further*, That no part of the sum provided for herein shall be expended for construction on account of any lands owned by the Southern Pacific Company until an appropriate contract in form approved by the Secretary of the Interior shall have been properly executed by the said company, fixing the price and conditions of sale of said lands to actual settlers, and such contract shall provide that until one-half of the construction charges against said lands shall have been fully paid no sale of any such lands shall be valid unless and until the purchase price involved in such sale is approved by the Secretary of the Interior, and shall also provide that upon proof of fraudulent representation as to the true consideration involved in any such sale the Secretary of the Interior is authorized to cancel the water right attaching to the land involved in such fraudulent sale; and all public lands irrigable under the Spanish Springs division shall be entered subject to the conditions of this section which shall be applicable thereto: *Provided further*, That the Secretary of the Interior is authorized to enter into such contract or contracts as may be possible whereby the State of Nevada, or local interests, shall aid in promoting the development and settlement of the project after completion by

the securing and selection of settlers and the financing of them to enable the purchase of the required livestock, equipment, and supplies and the improvement of the lands to render them habitable and productive: *Provided further*, That the operation and maintenance charges on account of land in this division shall be paid annually in advance not later than March 1, no charge being made for operation and maintenance for the first year after said public notice. It shall be the duty of the Secretary of the Interior to give such public notice when water is actually available for such lands: *Provided further*, That the existing water rights of the present water users of the Newlands project shall have priority over the water rights of the proposed Spanish Springs division: *Provided further*, That the lands on the existing project below the Lahontan Reservoir shall not be liable for any part of the construction costs of the Spanish Springs division: *Provided further*, That all net revenues from any power plant connected with the Spanish Springs division of the Newlands project shall be applied to the repayment of the construction costs incurred by the Government on said division until such obligations are fully repaid and all net revenues from any power plant connected with the Lahontan Reservoir of the Newlands project shall be applied to the repayment of the construction costs incurred by the Government on the existing project until such obligations are fully repaid;

Carlsbad project, New Mexico: For operation, maintenance, continuation of construction, and incidental operations, \$70,000;

Rio Grande project, New Mexico-Texas: For operation and maintenance, continuation of construction, and incidental operations, \$650,000;

Williston project (formerly North Dakota pumping project), North Dakota: For operation, maintenance, and incidental operations, \$25,000, to remain available until December 31, 1925. The Director of Reclamation is authorized, during the fiscal year 1925, or thereafter, to appraise the buildings, machinery, equipment, and all other property of whatever nature or kind appertaining to this project and to lease or to sell the same at public or private sale, on such terms and in such manner as he may deem for the best interests of the Government, reserving the right to reject any and all bids. The proceeds from such lease or sale shall be paid into the reclamation fund;

Baker project, Oregon: For investigation, commencement of construction, and incidental operations, the unexpended balance of the appropriation for this purpose for the fiscal year 1925 is reappropriated and made available for the fiscal year 1926;

Owyhee irrigation project, Oregon: The unexpended balance, if any, remaining at the close of the fiscal year 1925 from the appropriation of \$315,000 made by the act referred to as the "second deficiency act, fiscal year 1924," approved December 5, 1924 (Public, Numbered 292), for continued investigations, commencement of construction, and incidental operations, Owyhee irrigation project, Oregon, is hereby reappropriated, to be available and to continue available for use during the fiscal year 1926;

Umatilla project, Oregon: For operation and maintenance, continuation of construction, and incidental operations, \$840,000;

Vale project, Oregon: For continued investigations, commencement of construction, and incidental operations, \$500,000: *Provided*, That no part of this appropriation shall be used for construction purposes on the Vale project until a contract or contracts in form approved by the Secretary of the Interior shall have been made with an irrigation district or with irrigation districts organized under State law, providing for payment by the district or districts as hereinafter provided: *Provided further*, That no part of the sum provided for herein shall be expended for construction on account of any lands in private ownership until an appropriate repayment contract in accordance with the terms of this act and, in form approved by the Secretary of the Interior, shall have been properly executed by a district organized under State law, embracing the lands in public or private ownership irrigable under the project and the execution thereof shall have been confirmed by a decree of a court of competent jurisdiction, which contract, among other things, shall provide for an appraisal approved by the Secretary of the Interior, showing the present actual bona fide value of all such irrigable lands, fixed without reference to the proposed construction, and shall provide that until one-half the construction charges against said lands shall have been fully paid no sale of any such lands shall be valid unless and until the purchase price involved in such sale is approved by the Secretary of the Interior, and shall also provide that upon proof of fraudulent representation as to the true consideration involved in any such sale the Secretary of the Interior is authorized to cancel the water right attaching to the land involved in such fraudulent sale; and all public lands irrigable under the project shall be entered subject to the conditions of this section, which shall be applied thereto: *Provided further*, That no water shall be delivered to irrigators on this project until a contract or contracts shall have been executed between the United States and the State of Oregon, whereby the State shall assume the duty and responsibility of promoting the development and settlement of the project after completion, including the subdivision of lands held in private ownership by any individual in excess of one hundred and sixty irrigable acres, the securing, selection, and financing of settlers to enable the purchase of the required livestock, equipment, and supplies and the improvement of the lands to render them habitable and productive. The State shall provide the funds necessary for this purpose and shall conduct operations in a manner satisfactory to the Secretary of the Interior: *Provided further*, That the operation and maintenance charges on account of land in this project shall be paid annually in advance not later than March 1, no charge being made for operation and maintenance for the first year after said public notice. It shall be the duty of the Secretary of the Interior to give such public notice when water is actually available for such lands: *Provided further*, That not more than \$200,000 of the amount herein appropriated shall be available for purchase of

an interest in the existing storage reservoir of the Warm Springs project, said interest to be conveyed to the United States free of all prior liens and encumbrances of every kind whatever: *Provided further*, That the contract for the purchase of said interest in said reservoir shall also provide for construction of the necessary drainage works by the said Warm Springs and Vale projects and the proportion of cost of said works to be borne by each;

Klamath project, Oregon-California: For operation and maintenance, continuation of construction, and incidental operations, \$561,000;

Belle Fourche project, South Dakota: For operation and maintenance, continuation of construction, and incidental operations, \$65,000: *Provided*, That the unexpended balance of \$100,000 allotted for drainage under this paragraph for the fiscal year 1925 is reappropriated and made available for such purpose for the fiscal year 1926;

Strawberry Valley project, Utah: For operation and maintenance, continuation of construction, and incidental operations, \$39,000;

Salt Lake Basin project, Utah, first division: For construction of Echo Reservoir, Utah Lake control, and Weber-Provo Canal, and incidental operations, \$900,000: *Provided*, That any unexpended balance of any appropriation available for the Salt Lake Basin project for the fiscal year 1925 shall remain available during the fiscal year 1926: *Provided further*, That no part of this appropriation shall be used for construction purposes until a contract or contracts in form approved by the Secretary of the Interior shall have been made with an irrigation district or with irrigation districts organized under State law, or water users' association or associations, providing for payment by the district or districts, or water users' association or associations, as hereinafter provided: *Provided further*, That the operation and maintenance charges on account of land in this project shall be paid annually in advance not later than March 1, no charge being made for operation and maintenance for the first year after said public notice. It shall be the duty of the Secretary of the Interior to give such 'public notice when water is actually available for such lands;

Okanogan project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$70,000;

Yakima project, Washington: For operation and maintenance, continuation of construction, and incidental operations, \$295,000;

Yakima project (Kittitas Division), Washington: For construction of the Kittitas Division and incidental operations, \$375,000: *Provided*, That no part of this appropriation shall be used for construction purposes until a contract or contracts in form approved by the Secretary of the Interior shall have been made with an irrigation district or with irrigation districts organized under State law providing for payment by the district or districts as hereinafter provided. The Secretary of the Interior shall by public notice announce the date when water is available under the project: *Provided further*, That

(Continued on page 54)

THE FACT FINDERS ACT AND OTHER LEGISLATION

Reappraisal of projects, with appropriation of \$150,000.—\$200,000 for Yuma Mesa; \$125,000 for Picacho Wash; \$111,000 for Little Payette Lake storage; and \$50,000 for Orland storage right of way

(Continued from page 53)

no part of the sum provided for herein shall be expended for construction on account of any lands in private ownership until an appropriate repayment contract, in form approved by the Secretary of the Interior, shall have been properly executed by a district organized under State law, embracing the lands in public or private ownership irrigable under the project, and the execution thereof shall have been confirmed by decree of a court of competent jurisdiction, which contract, among other things, shall contain a provision for an appraisal, showing the present actual bona fide value of all such irrigable lands fixed without reference to the proposed construction of said Kittitas Division, and shall provide that until one-half the construction charges against said lands shall have been fully paid no sale of any such lands shall be valid unless and until the purchase price involved in such sale is approved by the Secretary of the Interior, and shall also provide that upon proof of fraudulent representation as to the true consideration involved in any such sale the Secretary of the Interior is authorized to cancel the water right attaching to the land involved in such fraudulent sale; and all public lands irrigable under the project shall be entered subject to the conditions of this section which shall be applicable thereto: *Provided further*, That no part of the sum hereby appropriated shall be expended for construction until a contract or contracts shall have been executed between the United States and the State of Washington pursuant to its land settlement act embodied in chapter 188, Laws of 1919, as amended by chapter 90, Laws of 1921, and by chapters 34 and 112, Laws of 1923, or additional enactments, if necessary, whereby the State shall assume the duty and responsibility of promoting the development and settlement of the project after completion, including the subdivision of lands held in private ownership by any individual in excess of one hundred and sixty irrigable acres, the securing, selection, and financing of settlers to enable the purchase of the required livestock, equipment, and supplies, and the improvement of the lands to render them habitable and productive. The State shall provide the funds necessary for this purpose and shall conduct operations in a manner satisfactory to the Secretary of the Interior: *Provided further*, That the operation and maintenance charges on account of land in this project shall be paid annually in advance not later than March 1, no charge being made for operation and maintenance for the first year after said public notice. It shall be the duty of the Secretary of the Interior to give such public notice when water is actually available for such lands;

The unexpended balance, if any, remaining at the close of the fiscal year 1925 from the appropriation of \$375,000 made by the act referred to as the "second deficiency act, fiscal year 1924," approved December 5, 1924 (Public, No. 292), for continued investigation, commencement of construction of the Kittitas unit, and incidental operations, Yakima project, Washington, is hereby reappropriated, to

be available and to continue available for use during the fiscal year 1926;

Riverton project, Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$790,000;

Shoshone project, Wyoming: For operation and maintenance, continuation of construction, and incidental operations, \$414,000;

Umatilla Rapids project, Oregon: For investigation of the feasibility of irrigation by gravity or pumping, water sources, water storage, and related problems on the Columbia River and its tributaries, and for cooperative and miscellaneous investigations of the feasibility of reclamation projects, including personal services in the District of Columbia and elsewhere, and incidental expenses, the unexpended balance of this appropriation contained in the act of March 4, 1923 (Forty-second Statutes at Large, page 1540), is hereby reappropriated and made immediately available;

Secondary projects: For cooperative and general investigations, \$50,000;

To enable the Secretary of the Interior to meet the requirements of Article VI of the treaty of January 11, 1909 (Thirty-sixth Statutes at Large, page 2448), between the United States and Great Britain for gauging the streams and determining the water supply of the northern or eastern tributaries of Milk River, Montana, including personal services in the District of Columbia and elsewhere; the purchase, exchange, hire, maintenance, repair, and operation of motor-propelled or horse-drawn, passenger-carrying vehicles, \$10,000, to be expended under and in accordance with the provisions of the act of June 17, 1902 (Thirty-second Statutes at Large, page 388), and amendatory or supplementary acts.

Under the provisions of this act no greater sum shall be expended, nor shall the United States be obligated to expend, during the fiscal year 1926, on any reclamation project appropriated for herein, an amount in excess of the sum herein appropriated therefor, nor shall the whole expenditures or obligations incurred for all of such projects for the fiscal year 1926 exceed the whole amount in the "reclamation fund" for that fiscal year;

Ten per centum of the foregoing amounts shall be available interchangeably for expenditures on the reclamation projects named; but not more than 10 per centum shall be added to the amount appropriated for any one of said projects, except that should existing works or the water supply for lands under cultivation be endangered by floods or other unusual conditions an amount sufficient to make necessary emergency repairs shall become available for expenditure by further transfer of appropriation from any of said projects upon approval of the Secretary of the Interior;

Whenever, during the fiscal year ending June 30, 1926, the Commissioner of the Bureau of Reclamation shall find that the expenses of travel, including the local transportation of employees to and from

their homes to the places where they are engaged on construction or operation and maintenance work, can be reduced thereby he may authorize the payment of not to exceed 3 cents per mile for a motor cycle or 7 cents per mile for an automobile used for necessary official business;

Total, from reclamation fund, \$9,999,000.

Approved March 3, 1925.

THE FACT-FINDERS ACT

[Extract from an act making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1924, and prior fiscal years, to provide supplemental appropriations for the fiscal year ending June 30, 1925, and for other purposes]

SEC. 4. Subsection A. That when used in this section (a) The word "Secretary" means the Secretary of the Interior. (b) The words "reclamation law" mean the act of June 17, 1902 (32 Stat., p. 388), and all acts amendatory thereof or supplementary thereto. (c) The words "reclamation fund" mean the fund provided by the reclamation law. (d) The word "project" means a Federal irrigation project authorized by the reclamation law. (e) The words "division of a project" mean a substantial irrigable area of a project designated as a division by order of the Secretary.

Subsec. B. That no new project or new division of a project shall be approved for construction or estimates submitted therefor by the Secretary until information in detail shall be secured by him concerning the water supply, the engineering features, the cost of construction, land prices, and the probable cost of development, and he shall have made a finding in writing that it is feasible, that it is adaptable for actual settlement and farm homes, and that it will probably return the cost thereof to the United States.

Subsec. C. That the Secretary is hereby authorized, under regulations to be promulgated by him, to require of each applicant, including preference right ex-service men for entry to public lands on a project, such qualifications as to industry, experience, character, and capital, as in his opinion are necessary to give reasonable assurance of success by the prospective settler. The Secretary is authorized to appoint boards in part composed of private citizens to assist in determining such qualifications.

Subsec. D. That the irrigable lands of each new project and new division of a project hereinafter approved shall be classified by the Secretary with respect to their power, under a proper agricultural program, to support a family and pay water charges, and the Secretary is authorized to fix different construction charges against different classes of land under the same project for the purpose of equitably apportioning the total construction cost so that all lands may as far as practicable bear the burden of such cost according to their productive value.

Subsec. E. That hereafter the Secretary shall as to each irrigable acre of land in each new project, or a new division of a project, issue two public notices relating to construction charges. The first public notice shall be issued when the land is ready for settlement and will announce the construction charge per irrigable acre. The second public notice shall be issued when in the opinion of the Secretary the agricultural development of the project shall have advanced sufficiently to warrant the commencement of payment of installments of such construction charge. The second public notice shall fix the date when payments will begin on the construction charge announced by the first public notice, which date shall be not more than five years from the date of the first public notice.

Subsec. F. That hereafter all project construction charges shall be made payable in annual installments based on the productive power of the land as provided in this subsection. The installment of the construction charge per irrigable acre payable each year shall be 5 per centum of the average gross annual income for the ten calendar years first preceding, or for all years of record if fewer than ten years are available, of the area in cultivation in the division or subdivision thereof of the project in which the land is located, as found by the Secretary annually. The decision of the Secretary as to the amount of any such installment shall be conclusive. These annual payments shall continue until the total construction charge against each unit is paid. The Secretary is authorized upon request to amend any existing contract for a project water right so that it will provide for payment of the construction charge thereunder in accordance with the provisions of this subsection or for the deferment of such construction charges for a period of three years from the approval of this section, or both.

Subsec. G. That whenever two-thirds of the irrigable area of any project, or division of a project, shall be covered by water-right contracts between the water users and the United States, said project shall be required, as a condition precedent to receiving the benefits of this section to take over, through a legally organized water-users' association or irrigation district, the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as the Secretary may prescribe, and thereafter the United States, in its relation to said project, shall deal with a water-users' association or irrigation district, and when the water users assume control of a project, the operation and maintenance charges for the year then current shall be covered into the construction account to be repaid as part of the construction repayments.

Subsec. H. That the penalty of 1 per centum per month against delinquent accounts, provided in section 3 and section 6 of the act of August 13, 1914 (Thirty-eighth Statutes, page 686), is hereby reduced to one-half of 1 per centum per month, as to all installments which may hereafter become due.

Subsec. I. That whenever the water users take over the care, operation, and maintenance of a project or a division of a project the total accumulated net profits, as determined by the Secretary, derived from the operation of project power

plants, leasing of project grazing and farm lands, and the sale or use of town sites shall be credited to the construction charge of the project, or a division thereof, and thereafter the net profits from such sources may be used by the water users to be credited annually, first, on account of project construction charge, second on account of project operation and maintenance charge, and third, as the water users may direct. No distribution to individual water users shall be made out of any such profits before all obligations to the Government shall have been fully paid.

Subsec. J. That all moneys or profits as determined by the Secretary heretofore or hereafter derived from the sale or rental of surplus water under the Warren Act of February 21, 1911 (Thirty-sixth Statutes, page 925), or from the connection of a new project with an existing project shall be credited to the project or division of the project to which the construction cost has been charged.

Subsec. K. That on each existing project where, in the opinion of the Secretary, it appears that on account of lack of fertility in the soil, an inadequate water supply, or other physical causes, settlers are unable to pay construction costs, or whenever it appears that the cost of any reclamation project by reason of error or mistake or for any cause has been apportioned or charged upon a smaller area of land than the total area of land under said project, the Secretary is authorized to undertake a comprehensive and detailed survey to ascertain all pertinent facts, and report in each case the result of such survey to the Congress with his recommendations: *Provided*, That the cost and expense of each such survey shall be charged to the appropriation for the project on account of which the same is made, but shall not be charged as a part of the construction or operation and maintenance cost payable by the water users under the project.

(Continued on page 56)

APPROPRIATIONS FOR RECLAMATION, 1925 AND 1926

Projects	1926 Interior Department appropriation bill approved Mar. 3, 1925	Unexpended balances from other appropriations (columns 3, 4, and 5) made available fiscal year 1926	Second deficiency act of 1924 (H. R. 9559, Pub. No. 292, fiscal year 1925)	First deficiency act of 1925 (H. R. 11308, Pub. No. 326, available 1925 and fiscal year 1926)	Second deficiency act of 1925 (H. R. 12392, available 1925 and fiscal year 1926)
	1	2	3	4	5
Salt River.....	\$5,000				
Yuma.....	432,000	¹ \$125,000.00			¹ \$125,000.00
Orland.....	34,000	250,000.00			
Grand Valley.....	278,000	50,000.00			50,000.00
Uncompahgre.....	163,000				
King Hill.....	35,000				
Minidoka.....	797,000				
Boise.....	439,000	² 111,000			² 111,000
Huntley.....	118,000				
Milk River.....	76,000				
Sun River (Greenfields).....	611,000				
Lower Yellowstone.....	180,000				
North Platte.....	510,000				
Newlands.....	167,000	400,000.00			
Carlsbad.....	70,000				
Rio Grande.....	650,000				
Williston.....	³ 25,000				
Baker.....		495,935.04			
Umatilla.....	840,000				
Klamath.....	561,000				
Belle Fourche.....	65,000	⁴ 100,000.00			
Strawberry Valley.....	39,000				
Okanogan.....	70,000				
Yakima.....	295,000				
Riverton.....	790,000				
Sboshone.....	414,000				
Secondary.....	50,000		\$21,500.00		
Cooperative investigations.....			125,000.00		
Yuma Auxiliary.....		200,000.00			200,000.00
NEW WORK					
Guernsey Reservoir.....		800,000.00	800,000.00		
Spanish Springs.....	500,000				
Owyhee.....		315,000.00	315,000.00		
Vale.....	500,000				
Salt Lake Basin.....	900,000	375,000.00	375,000.00		
Yakima-Kittitas.....	375,000	375,000.00	375,000.00		
Umatilla Rapids.....		⁵ 50,000.00			
Economic surveys.....		150,000.00		\$150,000.00	
MISCELLANEOUS ITEMS					
To pay Mary McConnell.....					289.00
Gaging streams, Milk River.....	10.000				
	9,999,000		2,011,500.00	150,000.00	486,289.00

¹ Carry over, unexpended balance fiscal year 1925, not to exceed \$125,000 (for Picacho Wash).

² Carry over, unexpended balance fiscal year 1925, not to exceed \$111,000 (Little Payette Lake storage).

³ Available until Dec. 31, 1925.

⁴ Amount is definite reappropriation from fiscal year 1925 (drainage construction), \$100,000.

⁵ Appropriation was payable from general funds of Treasury. There remains unexpended Jan. 31, 1925, about \$200.

NOTE.—Final amounts of unexpended balances of appropriations shown in column 2 and not covered by explanatory footnotes, will be determined after June 30, 1925.

RECLAMATION LEGISLATION

(Continued from page 55)

Subsec. L. That in any adjustment of water charges as provided in this section all due and unpaid charges to the United States, both on account of construction and on account of operation and maintenance, including interest and penalties, shall be added in each case to the total obligation of the water users, and the new total thus established shall then be the construction charge against the land in question.

Subsec. M. That every entryman or assignee on a project farm unit not yet patented which unit shall be found by the Secretary to be insufficient to support a family and pay water charges shall have the right upon application to exchange his entry for another farm unit of unentered public land on the same or another project located in the same State, in which event all instalments of construction charges theretofore paid on account of the relinquished farm unit shall be credited on account of the new farm unit taken in exchange: *Provided*, That where two entrymen apply for the same farm unit under the exchange provision of this subsection, only one of whom is an ex-service man, as defined by the joint resolution of January 21, 1922 (Forty-second Statutes, page 358), the ex-service man shall have a preference in making such exchange.

Subsec. N. That all contracts providing for new projects and new divisions of projects shall require that all operation and maintenance charge shall be payable in advance. In each case where the care, operation, and maintenance of a project or division of a project are transferred to the water users the contract shall require the payment of operation and maintenance charges in advance. That whenever an adjustment of water charges is made under this section the adjustment contract shall provide that thereafter all operation and maintenance charges shall be payable in advance.

Subsec. O. That the cost and expense after June 30, 1925, of the main office at Washington, District of Columbia, of the Bureau of Reclamation in the Department of the Interior, and the cost and expense of general investigations heretofore and hereafter authorized by the Secretary, shall be charged to the general reclamation fund and shall not be charged as a part of the construction or operation and maintenance cost payable by the water users under the projects.

Subsec. P. That where, in the opinion of the Secretary, a right of way or easement of any kind over public land is required in connection with a project the Secretary may reserve the same to the United States by filing in the General Land Office and in the appropriate local land office copies of an instrument giving a description of the right of way or easement and notice that the same is reserved to the United States for Federal irrigation purposes under this section, in which event entry for such land and the patent issued therefor shall be subject to the right of way or easement so described in such instrument; and reference to each such instrument shall be made in the appropriate tract books and also in the patent.

Subsec. Q. That where real property or any interest therein heretofore has been, or hereafter shall be, donated and conveyed to the United States for use in connection with a project, and the Secretary decides not to utilize the donation, he is authorized without charge to reconvey such property or any part thereof to the donating grantor, or to the heirs, successors, or assigns of such grantor.

Subsec. R. That there is hereby authorized to be appropriated from the General Treasury, the sum of \$100,000 for investigations to be made by the Secretary through the Bureau of Reclamation to obtain the necessary information to determine how arid and semiarid, swamp, and cut-over timberlands may best be developed.

Approved December 5, 1924.

REAPPRAISAL OF PROJECTS

[Extract from first deficiency act, fiscal year 1925]

Reclamation fund, special fund: The following sum is appropriated out of the special fund in the Treasury of the United States, created by the act of June 17, 1902, and therein designated "the reclamation fund":

For carrying into effect the provisions of subsection K of section 4 of the second deficiency act, fiscal year 1924, approved December 5, 1924, to remain available until June 30, 1926, \$150,000: *Provided*, That the expenditures from this appropriation for each reclamation project shall be considered as supplemental to the appropriation for that project and shall be accounted for accordingly.

THE YUMA MESA

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$200,000, to be paid out of the reclamation fund established by the act of June 17, 1902 (Thirty-second Statutes, page 388), for operation and maintenance and completion of construction of the irrigation system required to furnish water to all of the irrigable lands in part 1 of the Mesa division, otherwise known as the first Mesa unit of the Yuma auxiliary project, authorized by the act of January 25, 1917 (Thirty-ninth Statutes, page 868), as amended by the act of February 11, 1918 (Fortieth Statutes, page 437): *Provided*, That all moneys received by the United States in payment of land and water rights in said part 1 of the Mesa division, beginning one year from the date this act becomes effective, shall be covered into the reclamation fund until the sum advanced from said fund hereunder is fully paid: *Provided further*, That the purchase price of land and water rights hereafter sold in said part 1 of the Mesa division shall be paid to the United States in ten equal installments, the first of which shall be due and payable at the date of the purchase, and the remaining installments annually there-

after, with interest on deferred installments at the rate of 6 per centum per annum, payable annually; and the Secretary of the Interior is authorized, at any time within one year from the date this act becomes effective, to amend any existing uncompleted contract for the purchase of land and water rights so that the aggregate amount of principal and interest remaining unpaid under such contract may be paid in ten equal installments in accordance with the conditions of this proviso, beginning with the date of amendatory contract: *And provided further*, That land and water rights in said part 1 of the Mesa division heretofore or hereafter offered at public sale under said act of January 25, 1917, and not disposed of at such public sale may be sold later at private sale at not less than \$25 per acre for the land and at \$200 per acre for the water right.

Approved February 21, 1925.

[Extracts from the second deficiency act, fiscal year 1925]

YUMA AUXILIARY PROJECT, ARIZONA

For operation and maintenance and completion of the irrigation system required to furnish water to all of the irrigable lands in part one of the Mesa division, otherwise known as the first Mesa unit of the Yuma auxiliary project, Arizona, in accordance with the provisions of the act entitled "An act to authorize the appropriation of certain amounts for the Yuma irrigation project, Arizona, and for other purposes," approved February 21, 1925, \$200,000, to be paid out of the "reclamation fund," to remain available during the fiscal year 1926, and to include the general objects of expenditure enumerated in the second paragraph under the caption "Bureau of Reclamation," contained in the Interior Department appropriation act for the fiscal year 1925.

* * * * *

PICACHO WASH

Not to exceed \$125,000 of the unexpended balance of appropriation for operation and maintenance, continuation of construction, and incidental operations in connection with the Yuma project, Arizona-California, contained in the Interior Department appropriation act for the fiscal year 1925, is continued and made available during the fiscal year 1926 for the continuation of construction of flood-protection works in the main canal near Picacho Wash.

* * * * *

BOISE PROJECT, IDAHO

Not exceeding \$111,000 of the appropriation of \$1,080,000 from the reclamation fund, special fund, for the Boise project, Idaho, for the fiscal year 1925, made by the Interior Department appropriation act, approved June 5, 1924, may be used for continued investigation, commencement of construction of additional storage, and incidental operations, to remain available during the fiscal year 1926.

* * * * *

(Continued on page 57)

COMMERCIAL POWER ON THE MINIDOKA PROJECT, 1924

Electrical Assistant W. B. Clayton describes in nontechnical language the complex situation with regard to sliding scale and variable load factor, showing the cost of electric service to consumers on the project

FORTUNE has favored the Minidoka project in Southern Idaho in providing a surplus of electric power over the demands of the electric pumping division on the south side of Snake River, and the surplus has been put to beneficial use in various ways. During 1924, 7 towns, 20 rural companies and 38 individual consumers were served under a total of 65 contracts for electric light and power, and 15 contracts for electric heating were in effect.

The city of Burley, Idaho, having a population of about 5,000, had a total of 911 consumers for all classes of electric service and purchased 2,737,600 kilowatt-hours from the Bureau of Reclamation at a cost of \$32,573.14, or 1.2 cents per kilowatt-hour. The city stands all distribution losses and the costs of distribution including operation and maintenance of the system, depreciation, interest on bonds, renewals of equipment, etc., which adds greatly to the bare energy cost. The city sold this energy as shown by the following tabulation:

Electrical energy distributed by the city of Burley

	Kilowatt-hour sold	Gross revenue	Gross revenue per kilowatt-hour
			Cents
Lighting.....	583, 189	\$32, 282. 04	5. 5
Power.....	1, 047, 933	13, 215. 57	1. 26
Cooking.....	330, 839	8, 723. 00	2. 65
Water heating.....	470, 585	4, 093. 80	. 87
Total.....	2, 432, 546	58, 314. 41	

Small consumers pay a higher rate per kilowatt-hour than the larger consumers. Under existing lighting rates the small consumer is entitled to use 50 kilowatt-hours for a minimum payment of \$1.84 per month or 3.7 cents per kilowatt-hour. If he does not use his minimum, the unit cost is proportionately higher, of course. A larger consumer using 150 kilowatt-

hours per month pays \$4.14 monthly, or 2.8 cents per kilowatt-hour. Electric air heating has not been included in the above figures. Heat is purchased at the special rate of \$1.25 per kilowatt per month from the Bureau of Reclamation. A Burley heat consumer using 1 kilowatt of heat pays \$2.50 per month and a user of 10 kilowatts pays \$22.50 per month. A user of 50 kilowatts pays \$90 per month.

The 20 rural companies grouped together had 711 consumers, and purchased 527,936 kilowatt-hours during the year at a cost of \$10,622.87, or 2 cents per kilowatt-hour on the average. It should be understood that those companies making the most constant use of energy at high-load factor obtain the lowest unit price on purchased energy, as the standard rate schedule of the Minidoka project was purposely designed to encourage constant loads rather than fluctuating loads. A company or other user who uses his maximum demand only 50 hours a month pays 4 cents per kilowatt-hour. If the maximum demand is used 720 hours per month the rate drops to an average of 1.12 cents per kilowatt-hour. Both rates are subject to various discounts and additions. Complete records of energy sales and revenue as retailed by these mutual rural companies are not available for the group as a whole, but the records of the following four companies will be indicative:

	Number of consumers	Energy purchased		Energy sold		
		Kilowatt-hours	Cost	Kilowatt-hours	Revenue	Unit cost
Unity Light & Power Co.....	174	159, 280	\$2, 721. 92	99, 869	\$4, 876. 36	\$0. 0488
East End Electric Co.....	81	53, 440	1, 047. 20	25, 697	1, 636. 90	. 0636
Riverside Electric Co.....	55	14, 100	1 370. 25	18, 976	1 628. 31	. 07
Accquia Electric Co.....	25	17, 420	473. 74	10, 541	871. 71	. 0827

¹ Six months' period.

CANADA'S EX-SOLDIERS ASSISTED IN FARMING

A recent press dispatch from Ottawa, Canada, states that former soldiers of the Dominion's war-time armies to the number of 30,604 have been established on farms of their own, according to the report of the soldier-settlement board.

Of this total 24,143 have been granted loans, some as high as \$7,500 each, and the remainder have been given grants of Dominion land without loans. A total of

\$103,150,098¹ has been spent for land, clearing, permanent improvements, and stock equipment. Veterans already have returned \$19,000,000 to the Government in repayment of principal and in interest on loans.

The majority of the soldier settlers have made good on the farm. Those who had no agricultural experience have been trained in special schools. Field supervisors of the soldier settlement board visit the veterans at intervals, superintend their farming operations, and give them practical help.

PROJECT LEGISLATION

(Continued from page 56)

ORLAND PROJECT, CALIFORNIA

For continued investigations, purchase of rights of way, and incidental operations, \$50,000, to be paid out of the "reclamation fund" and to remain available until June 30, 1926.

* * * * *

Approved March 4, 1925.

PILOT BUTTE POWER PLANT, RIVERTON PROJECT

Assistant Engineer Arthur Ruettgers describes the newly constructed hydroelectric power plant, which furnishes current for the operation of the electric drag lines used on canal and drain construction

DELIVERY of electric energy from the Pilot Butte power plant, the newly constructed hydroelectric plant on the Riverton project in Wyoming, was begun on January 8, 1925.

The source of power is a drop of 90 to 105 feet taken by the water in its diversion from the Wyoming Canal to the Pilot Butte Reservoir, an equalizing reservoir at the head of the Pilot Canal. The primary purpose of the plant is to generate current for the operation of electric drag lines to be used in the construction of main canals and drains for the balance of the project.

A penstock, power station, and tailrace make up the essential features of the plant.

The penstock consists of a 62-inch steel-lined, reinforced concrete, monolithic pipe, 920 feet long, with concrete intake and riveted-steel manifold. The intake, which is equipped with a cast-iron vertical gate, trash racks, sand sluice, and operating house, was not built as a separate structure but forms a part of a combined diversion structure at station 487 of the Wyoming Canal.

As constructed, the power station includes a complete substructure, superstructure, and switch yard for one unit of 800-kilowatt capacity, also an additional concrete draft tube for a proposed future second unit. Outside dimensions of the power house and adjacent switch yard are 26 by 41 feet and 13 by 35 feet respectively. The substructure is of reinforced concrete. Except for structural steel roof trusses, the superstructure is of framed timber with corrugated iron exterior and plaster-board interior. A

10-ton hand-operated overhead crane is provided for handling the machinery. The generating unit consists of a 1,000 Kv. a., 2,300-volt, 3-phase, 60-cycle vertical generator with direct connected exciter, driven by a 1,200 horsepower vertical-shaft, single-runner, spiral-case hydraulic turbine equipped with governor and synchronous relief valve.

To avoid expensive future enlargement, the tailrace was excavated for a full two-unit development. It consists essentially of an open channel about 450 feet long extending from the south wall of the power house to the edge of the reservoir, the upper 40 feet being lined with concrete to serve as a transition. A

check is provided at the end of this transition to maintain a water level sufficiently high to prevent breaking of the water column in the turbine draft tube.

Direct connection between the Wyoming Canal and the Pilot Butte Reservoir is furnished by a concrete wasteway which practically parallels the power penstock. Although this structure is not considered a part of the power plant, its use is indispensable in affording a by-pass and a means for disposal of sand, ice, etc.

Construction was begun in September, 1923, and completed early in January, 1925. All purchased materials and equipment were hauled by contract from Riverton, a distance of 26 miles. Sand and gravel were also hauled to the work by contract from a crushing and screening plant at station 295 of the Wyoming Canal, about 4 miles distant. Water was pumped from Pilot Butte Reservoir through a pipe line about three-fourths of a mile long.

The work was performed under the supervision of H. D. Comstock, project superintendent, with R. V. Sass in direct charge of construction.

Efforts of the new owners of the Fallon sugar factory, Newlands project, to interest the farmers in growing sugar beets this season were unsuccessful.

Activities to encourage the pickle business continued on the Belle Fourche project, and it is expected that salting stations will be erected on the project this year.

The following State representatives on the board of survey and adjustments have been designated by the governors of the respective States and appointed by Secretary Work:

Colorado.—Barton O. Aylesworth, Fort Collins.

Idaho.—Warren G. Swendsen, Boise.

Montano.—I. D. O'Donnell, Billings.

Nevada.—George B. Thatcher, Reno.

New Mexico.—H. L. Kent, State College.

South Dakota.—B. F. Myers, Pierre.

Utah.—W. W. Armstrong, Salt Lake City.

Washington.—M. M. Moulton, Kennewick.

Wyoming.—A. J. Martin, Cody.



Pilot Butte power plant. Left, transformer yard; penstock, gatehouse, and wasteway intake in background. Right, tailrace view

DEVELOPMENT OF STATE SETTLEMENTS IN HUNGARY

Settlers on State settlements pay the purchase price of the land within 50 years, and are charged interest at the rate of 4 per cent—Loans for stock and seed furnished

STATE settlements are administered by the settlement bureau of the Royal Hungarian Treasury. There is no special department of the Government which is entrusted with the administration of other settlements. Applications for permits to reclaim and settle land are passed upon by the local authorities and then submitted to the Ministry of Agriculture for final approval.

The settlers on the State settlements are selected from the owners of small land holdings, agricultural laborers, and farm servants. There is a requirement of approximately \$800 capital, or the possession of the necessary farming implements. Settlers are further required to give a guaranty of \$300, and produce certificates showing that they have never been convicted of a crime.

The farm management on State settlements is under the personal supervision of an official delegated by the State, who furnishes all necessary advice and, during the winter months, gives lectures on practical farm management for the benefit of the settlers.

During the experimental period the State surveyed and divided the land and furnished the settlers with plans of the necessary buildings free of charge. State settlers and their families receive a special transportation allowance when moving from one place to another. Settlements consisting of 50 or more families are likewise exempted from the land tax for a period of six years, and settlements of less than 50, but not under 10 families, are exempted from this tax for a period of three years. To the State settlers is also given the privilege of beginning the payments on their land during the third year, and only the interest must be paid during the first two years.

The purchase price of the land is mutually agreed upon by private individuals. On the other hand, the State charges its cost price to the settlers. Both the State and private settlement organizers are obliged to turn over to the settlers all public buildings, including the church and the town lots necessary for the residences of the notary public, the priest, the school teacher, and the kindergarten teacher, as well as the area necessary for roads and highways. In addition, the founder of the settlement must transfer the land necessary for public purposes, as, cemetery, market place, school for forestry, etc., free of charge.

State settlers are furnished with advice and instruction by the settlement repre-

sentatives of the Treasury department, and agricultural journals and books are supplied gratis to the communities. During the winter lecture courses are given. There is also a model farm at every State settlement, the proprietor of which receives from the State the necessary amount of equipment free of interest and payable in easy installments.

State settlers receive further the amount necessary for the purchase of breeding stock, and this amount is free of interest and payable in installments over a period of four years. Sums necessary for the purchase of seed grain are likewise advanced for a period of one year, and without interest. Young fruit trees and grape shoots are distributed gratis.

The settlers on State settlements pay the purchase price within 50 years, and are charged interest at the rate of 4 per cent. Private settlers receive loans up to two-thirds of the appraised value of their property, from domestic financial institutions, while the proprietor of a settlement is obliged, upon request, to furnish a loan of \$160 at 5 per cent interest to any settler requesting it, and against the security of the settler's house.

On behalf of the State settlements, the State has subscribed to profit participating stock of the Hangya Cooperative Society, a society which buys and sells on a profit-sharing basis, and has erected on the settlements the buildings necessary to house the branch stores of this organization.

The members of State settlements are required to possess a minimum capital of \$800, as stated above. The capital requirements of private settlers are matters of mutual agreement between the parties concerned. State settlers are compelled to live on the settlement. In private settlements the matter of residence is determined by agreement. The initial cultivation on State settlements is done by the State either before the arrival of the settlers or during the period of settlement. The costs, however, must be borne by the settler, unless he can show good cause for exemption, in which case any costs incurred are charged to the national settlement fund. In private settlements this matter is also determined by mutual agreement.

The payment of the land or the repayment of loans may be specifically agreed upon, but the Minister of Agriculture, on the basis of the laws concerning settlements, may refuse to approve the agreement and refuse to grant the permit for

settlement. The interest on loans to State settlers is fixed at 4 per cent and in the case of private settlements a maximum of 5 per cent is prescribed. State settlers are granted the privilege of paying for their land or repaying loans within 50 years, and installments are begun in the third year. Only interest on the entire sum is payable during the first two years.

No free grants of land are made on State settlements. Patents or deeds are given after the payment of the first installment.

Conveying the property in private settlements is a matter of agreement. On a State settlement the holder may lease his land for a long term. This lease, however, may not be for a period of less than 50 years. At the request of a commonwealth, ecclesiastical foundation, entailed estate, or municipal corporation, the Minister of Agriculture may permit settlements on the holdings of these organizations, estates, etc., on a long-term lease basis. The lease in this case may, however, be for a period of less than 50 years.

A holding may be taken over on a basis of a long-term lease with a binding and clearly specified agreement or option of purchase, and this case is most frequently met with.

A settler on a State settlement may not transfer his holding to any person other than an immediate member of his family within a period of 15 years, under penalty of losing his right to it.

During the past five years there have been no appropriations for settlement matters, since settlements made under the law of 1894 were situated on areas which have been ceded to Rumania and Yugoslavia by the treaty of Trianon. There are but few towns or communities made up of these settlements in present Hungary. During the years preceding the war, State appropriations for settlement purposes amounted to \$200,000 annually.

A successful feeder will carefully watch his animals, observe the comparative results of different rations and systems of feeding, and will learn much through experience and experimentation on his own farm.

Feeders of hogs and poultry should provide plenty of variety in the ration, green feed whenever possible, and supplement the ration with dairy products, meat or fish scrap, or other feeds containing animal proteins.

LOCAL COOPERATIVE BOARDS

IN accordance with instructions sent to the projects the latter part of January, local cooperative boards have been appointed to work in conjunction with the board of survey and adjustments, whose itinerary is given on another page of this issue. It will be recalled that the duties of the local cooperative boards are as follows:

1. To secure and supervise a classification of the lands of the project, according to regulations furnished.

2. To state briefly in writing all project matters now in dispute or that now need adjustment.

3. To collect and tabulate all available information relative to settlers' indebtedness, mortgages, delinquent taxes, and any other charges that must be met by the settlers now or in the near future.

4. To collect and classify all crop record data of the past 10 years or the years of record, by classes according to the land classification.

The boards, as a rule, comprise the superintendent and two water users, or one water user from each division. As the ERA goes to press information has been received of the appointment of the following water users on these boards:

Grand Valley project, Colorado.—R. A. Snodgrass and M. W. Blakslee, representing the Grand Valley Water Users' Association; Howard Lambeth, representing the Orchard Mesa irrigation district.

Uncompahgre Valley project, Colorado.—W. Guy Merritt, Delta, Frank Mcaker, and John Howell, Montrose, Colorado.

Boise project, Idaho.—J. B. Newport, representing Black Canyon irrigation district, Notus; G. A. Remington, representing Nampa and Meridian irrigation district, Nampa; W. H. Kollenborn, representing one board of Payette-Boise Water Users' Association, Caldwell; L. J. Magee, representing one board of Payette-Boise Water Users' Association, Caldwell, Idaho.

King Hill project, Idaho.—Frank E. Wilson, Hammett; F. L. Kinkade, King Hill, Idaho.

Minidoka project, Idaho.—W. C. Paul, Rupert, representing the Minidoka irrigation district; W. L. Manning, Burley, representing the Burley irrigation district.

Huntley project, Montana.—C. E. Howe, Worden, Mont., Pryor division; O. P. Pesman, Pompeys Pillar, Mont., Fly Creek division; J. Kozeluh, Pompeys Pillar, Mont., eastern division.

Sun River project, Montana.—William Hanson, Fort Shaw, and C. W. Crabtree,

Simms, representing the Fort Shaw division; Earl G. Woods and Joseph Thorud, Fairfield, representing the Greenfields division.

Lower Yellowstone project, Montana-North Dakota.—Burton Adams, representing Lower Yellowstone irrigation district No. 1; S. J. Hardy, representing Lower Yellowstone irrigation district No. 2.

Carlsbad project, New Mexico.—Francis G. Tracy, Scott Etter, and John W. Lewis, Carlsbad, N. Mex.

Umatilla project, Oregon.—J. F. McNaught, Hermiston, representing the Hermiston irrigation district (east division); C. E. Glasgow, Irrigon, representing the West Extension irrigation district (west division).

Belle Fourche project, South Dakota.—G. W. Morsman, Nisland; C. E. Livingston, Newell, S. Dak.

Strawberry Valley project, Utah.—Karl F. Keeler, Strawberry High Line Canal Co.; and Alvin R. Creer, Spanish Fork South Irrigation Co.

Okanogan project, Washington.—John S. Petersen, Omak; R. C. Rasmussen, Okanogan, Wash.

Yakima project, Washington.—C. P. Wickersham, route 2, Yakima, and Clifford Kail, Tieton, representing the Tieton division; Sunnyside division; Clinton F. Price and T. A. Brashears, Outlook, representing the Outlook irrigation district; A. B. Delp and O. G. Patch, Sunnyside, representing the Snipes Mountain irrigation district; E. V. Heater and Frank Kinney, Grandview, representing the Grandview irrigation district; F. R. Anderson and A. E. Wilcox, Prosser, representing the Prosser irrigation district; S. J. Harrison, Sunnyside, and Arthur Johnson, Benton City, representing the Sunnyside irrigation district; George P. Eaton, Granger, and E. J. O'Brien, Outlook, representing the Granger irrigation district; F. E. Fyfe, Grandview, and E. C. Huston, Prosser, representing the Sunnyside Valley irrigation district.

Shoshone project, Wyoming (Garland division).—Earl Murray, Powell, Wyo; A. H. Glasgow, Powell, Wyo.

Not in five years has the United States presented so nearly a picture of balanced prosperity as it does now, declares A. B. Genung, agricultural economist for the United States Department of Agriculture. For the moment agriculture is swinging toward par, and the readjustment is a healthy one for the country.



One of twenty 5 feet by 5 feet cast-iron high-pressure outlet gates for American Falls Dam, Minidoka project, Idaho. These gates each weigh 62,000 pounds, or a total of about 1,250,000 pounds of castings. Contract was, executed with the Joshua Hendy Iron Works, of San Francisco, September 24, 1924, and delivery has recently been completed. Every gate was shipped ahead of the contract schedule, and final delivery was completed approximately 50 days ahead of the final delivery date fixed by the contract. Contract price was \$127,161.

LAND CLASSIFICATION REPORTS

THE following instructions concerning land classification maps and reports to be prepared by the local cooperative boards for the consideration of the board of survey and adjustments have been issued by Mr. Kreutzer, director of reclamation economics:

On some projects the land determined suitable for irrigation farming will be divided into less than four classes. Notwithstanding this fact, lands recommended for suspension shall be called class 5 lands and lands recommended for exclusion shall be called class 6 lands. One project classed its farm lands in first, second, and third class land. The land recommended for suspension would still be fifth class and land to be excluded sixth class. There would be no fourth-class land.

After the land classification is made by the classifiers, and approved by the local cooperative committee, six maps should be made on white prints and the farms colored thereon as follows: first class, red; second class, green; third class, blue; fourth class, yellow; fifth class, brown; sixth class, black.

Fifth and sixth class lands shall be delineated on each farm unit on the map, but the remaining portion of each farm shall be shown as one class.

A brief report on the land classification shall be prepared by the local cooperative committee, in which shall be given a list of the personnel used, the time the work started and when completed. A brief description should be given of each class of agricultural land with a discussion of crop adaptability and approximate crop yields. The discussion of class 5 and 6 lands should enumerate quite fully the physical disabilities of the lands in question, such as, unfavorable topography, thin soils, stony land, hard pan, alkali, high-water table, etc. A table should be inserted showing the number of farms and the total area of such farms in each class. Six of these reports, with land classification maps, should be made and signed by the local cooperative committee, two of which should be sent to the commissioner, one to the Denver office, one to the advisory adjustment board, and the remaining copies should be kept at the project office.

Crop records should be compiled and recorded in the report for the 10 years of record, including 1924, or for the years of record, if less than 10 years, for each class of land. If the advisory adjustment

board reaches a project before the crop data can be assembled, a later report can be submitted.

SECRETARY WORK LEAVES FOR WEST

Plans have been completed for an official trip of Secretary of the Interior Work to western States to examine into reclamation, national park, and Indian reservation problems in the Interior Department.

Secretary Work left Washington on March 18, and will be absent about a month. He was accompanied by Commissioner Mcad, of the Bureau of Reclamation, and Director Mather, of the National Park Service.

During the trip irrigation possibilities, flood control, and power development on the lower Colorado River, which has been a subject of investigation for 75 years, will be inspected. Secretary Work and his party will make a short journey into Mexico examining levees and canals now providing water for the irrigation of the Imperial Valley and will also look over the site for the proposed all-American canal in southern California.

The Secretary's itinerary includes two national parks and nine reclamation projects and Indian reservations. The national parks to be visited are the Sequoia National Park and the Yosemite National Park, both located in California.

On the trip to Federal reclamation projects, Secretary Work will meet with the water users and settlers, obtaining first-hand information concerning conditions existing on them.

The reappraisal of Government reclamation projects, the work of which is now being prosecuted by a special board, will also be checked up.

The projects on the itinerary include: Carlsbad project in New Mexico; Rio Grande project in New Mexico-Texas; Yuma and Yuma-Mesa project in Arizona-California; Klamath project in Oregon-California; Orland project in California; Newlands project in Nevada; Grand Valley and Uncompahgre projects in Colorado; and North Platte project in Nebraska-Wyoming.

DATES ON WHICH BOARD WILL VISIT PROJECTS

The itinerary of the committee of the board of survey and adjustments of which Ex-Governor Campbell is chairman follows: Rio Grande project in New Mexico-Texas, from March 12 to 17; Carlsbad project in New Mexico, from March 18 to 22; Grand Valley project in Colorado, from March 24 to 31; Belle Fourche project in South Dakota, from April 28 to May 5; Okanogan project in Washington, from May 7 to 11; Yakima project in Washington, from May 12 to 22; Klamath project in Oregon and California, from May 24 to 31; Strawberry Valley project in Utah, June 15.

The itinerary of the committee of the board of survey and adjustments, of which Doctor Widsøe is chairman, is as follows: Boise project in Idaho, from March 5 to 10; Minidoka project in Idaho, from March 12 to 17; King Hill project in Idaho, from March 18 to 25; Umatilla project in Oregon, from March 26 to 31; Huntley project in Montana, from April 27 to May 1; Lower Yellowstone project in Montana and North Dakota, from May 4 to 11; Milk River project in Montana, from May 12 to 19; Sun River project in Montana, from May 21 to 28.

The joint board with the full membership will conduct the survey of the following projects: Uncompahgre project in Colorado, from April 2 to 9; North Platte project in Nebraska and Wyoming, from April 11 to 18; Shoshone project in Wyoming, from April 19 to 26; Newlands project in Nevada, from June 3 to 12.

These dates will be followed unless some unforeseen circumstance makes a change desirable.

The following projects have not asked for adjustments: Salt River project in Arizona; Yuma project in Arizona and California; Orland project in California; Williston project in North Dakota; and Riverton project in Wyoming.

Dairying and diversified farming are one and the same. Diversified farming produces a variety of crops for market; a failure of any one or two does not mean bankruptcy for the farmer. The dairyman does not have all his eggs in one basket.

Farming, no matter how profitable, never reaches the position of dignity which is its heritage until the farm home becomes so attractive that it is the greatest pride of the entire family—something to be handed down from generation to generation.

COLONEL FLY'S "BELOVED YUMA MESA"

THE culmination of Col. Ben. Franklin Fly's efforts in behalf of the Yuma Mesa came recently with the passage of two acts of Congress, authorizing the appropriation of and appropriating \$200,000 for operation and maintenance and completion of the irrigation system required to furnish water to all the irrigable lands in part 1 of the Mesa division.

Colonel Fly became interested in the

development of the Mesa nine years ago, and has worked whole-heartedly and tirelessly in the interest of this frost-free citrus fruit garden spot of the Southwest. During this period Colonel Fly's enthusiasm over the possibilities of the Mesa never waned. The accompanying illustration shows him in various rôles in connection with the progress of the work.

It has long been demonstrated that the Mesa is perfectly adapted to the culture of oranges, grapefruit, dates, and grapes. The Mesa grapefruit ripens early and enjoys high prices.

Colonel Fly has been coming to Washington so often and for so many years that he seems like one of the "family" in reclamation headquarters, and he is always welcome because he is full of enthusiasm, a great friend of reclamation in general, and never seems to tire of telling about the wonders of his favored section of the country. He likes to refer to himself as the "Daddy of the Yuma Mesa."

UNIFORMITY IN PERSONNEL MATTERS

SECRETARY WORK has issued the following self-explanatory order under date of March 9, 1925:

"Personnel matters should receive closer attention from administrative officers of the department. Without an efficient personnel we can not hope to operate successfully, and without a satisfied personnel we can not expect efficiency.

"Uniformity in handling personnel matters in the department is necessary to protect the rights and interests of the Government and employees alike. Dissatisfaction has been created in the past by differing standards for promotion in the several bureaus and by too great a liberality in distributing increases in salary in those bureaus that have been more fortunate than others in securing generous appropriations.

"Efficiency and economy are each necessary to the other, and due regard must be given to the economical administration of the Government's business.

"It does not contribute to good service for bureau officers to recommend increases in salaries which the Secretary can not properly approve, for administrative reasons. The Secretary must necessarily consider comparable conditions and salaries throughout the department and follow a policy applicable to all bureaus alike.

"Promotions should not be made simply because a bureau happens to have surplus funds available. Merit and the good of the service must control. The present line-up of positions and salaries is considered the standard, and promotions as a rule should be made only when vacancies occur. New salary rates or new positions must not be created without full justification. A contrary policy, carried on for a prolonged period, would result in an unwarranted high average salary list.

"The promotion of employees to meet competition in private enterprise should not be given as a justification for an increase in salary. The department endeavors to compensate employees at rates commensurate with the duties performed, and no employee should be considered so indispensable as to interfere with his personal advancement elsewhere.

"Since promotions are based on individual qualifications and efficiency, stereotyped phraseology should be avoided in framing justifications. The Secretary is entitled to know in what particular the employee excels and the reasons for recognizing him should be so outstanding that there need be no difficulty in stating them specifically rather than in general language.

"In addition to the regular justification, bureau officers should specify that the particular employee is the one best entitled to an increase of salary, that a deficiency will not be created, and, in the District of Columbia, that the recommendation conforms to the current efficiency ratings.

"Promotions of more than one step can not be considered.

"Selecting employees in the higher grades for promotion in preference to those in lower grades where the standards of efficiency are comparable should be discontinued.

"Employees about to be transferred to new duties should not be promoted in advance of actually taking over the new work, nor should a promotion be made under a new assignment before the employee has demonstrated his ability to handle the job.

"A redistribution of the work and its absorption by other employees can usually be made when a vacancy occurs. The

object to be attained is a reduction in the salary roll and a gradual increase in the standards of efficiency, character, and qualifications of the employees of the department, with encouragement and increased earnings to the individual.

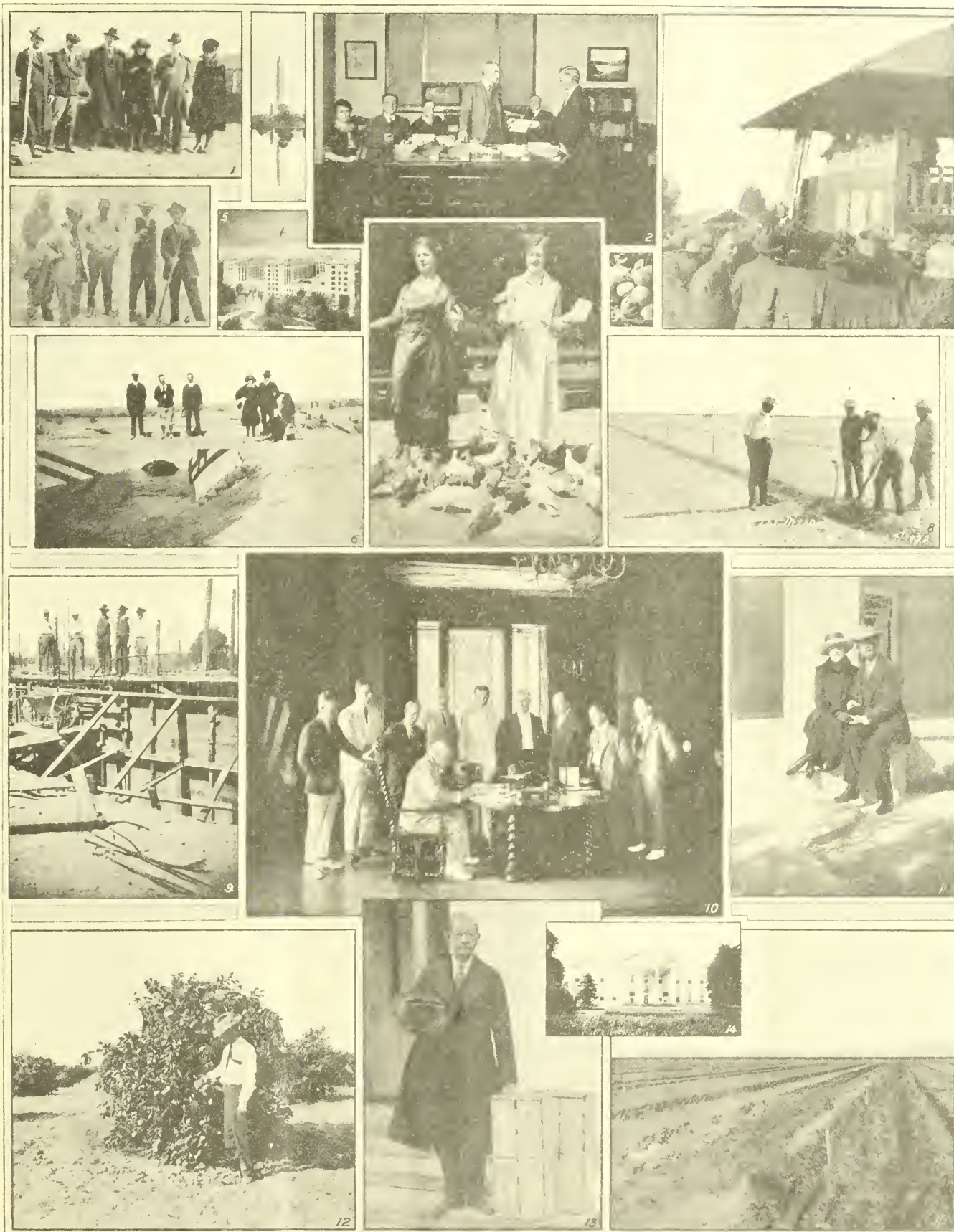
"Reallocation, ostensibly from change of status involving a new assignment of work, but actually prompted by a desire to increase salaries, is not justifiable. Employees should not be recommended for reallocation unless there has been a material change of duties due to rearrangement of work, or to fill a vacancy which involves the actual taking over of the duties of the position. Heads of bureaus should give their personal attention to such reallocations, and the job description should show unmistakable change in duties. The Secretary should not be expected to give his approval to recommendations for reallocation to a higher grade for the purpose of promotion only.

"HUBERT WORK,
Secretary."

LIVESTOCK INTERESTS CENTER IN DAIRY COW

Where the acre yield is smallest the use of livestock as a manufacturing agency is of greatest importance. It is indispensable that on lands of a low productive capacity animal husbandry be developed intensively. Probably this may in part explain the fact that in northern regions, where the soils are somewhat less productive and the climatic environment less favorable, a larger proportion of livestock is maintained on the farm. When farm animals are considered with these thoughts in mind, the dairy cow always becomes the center of consideration.

Large tracts of land on the Rio Grande project are being subdivided to accommodate new settlers who are locating in large numbers on the project.



COLONEL FLY'S BELOVED YUMA MESA

1. Colonel Fly digging the first shovelful of earth for the foundation of the pumping plant. 2. Colonel Fly receiving the order for the sale of the land on December 10, 1919. 3. Colonel Fly selling the first lot of Yuma Mesa land, December 10, 1919. 4. Colonel Fly setting the first bench mark. 5. The Interior Department building. 6. The first water being pumped. 7. Mrs. B. F. Fly (right) and her mother feeding pigeons on the mesa. 8. Colonel Fly planting the first orange tree on unit B, May 24, 1922. 9. The pumping plant under construction. 10. Former Secretary Lane authorizing the opening of Yuma Mesa. 11. Colonel and Mrs. B. F. Fly at their home on the mesa. 12. Four-year old grapefruit tree on the mesa. 13. Colonel Fly delivering Yuma Mesa grapefruit to the President at the White House. 14. The White House. 15. Young grapefruit and orange trees on the Yuma Mesa.



East Park Dam, Orland project, California

FRANCIS M. GOODWIN APPOINTED ON BOARD

Francis M. Goodwin, Assistant Secretary of the Interior, has been appointed by Secretary Work as a member of the board to review and reappraise Federal reclamation projects. Selection of Mr. Goodwin was due to his wide experience and extensive knowledge of irrigation problems and his thorough familiarity with the Northwest.

Mr. Goodwin has been Assistant Secretary of the Interior during the past four years. During this time he acted as chairman of the commission investigating the proposed Columbia Basin project in the State of Washington, having charge of the engineering, agricultural, and economical surveys made for the purpose of submitting a report to Congress on the feasibility of this immense irrigation undertaking. He will continue as head of this commission until its work is finished and its conclusions are finally sent to Congress.

In addition, Mr. Goodwin has had wide experience in public land and reclamation matters previous to his being appointed Assistant Secretary of the Interior. In 1901 he was named special agent of the General Land Office, being later promoted to chief of field division upon the reorganization of the field force and the establishment of field division offices.

In 1907 Mr. Goodwin resigned as chief of the field division of the General Land Office and was appointed as Special Assistant Attorney General. On retiring to private life he took up the practice of law at Spokane, Wash. His activity in the legal

profession brought him in touch with important litigation dealing with irrigation, reclamation, public lands, and power sites.

The board of review and appraisal of Federal reclamation projects of which Mr. Goodwin has been made a member, will visit practically all the projects in the West, examining into questions connecting with their reappraisal before making a final report to Congress at its next term.

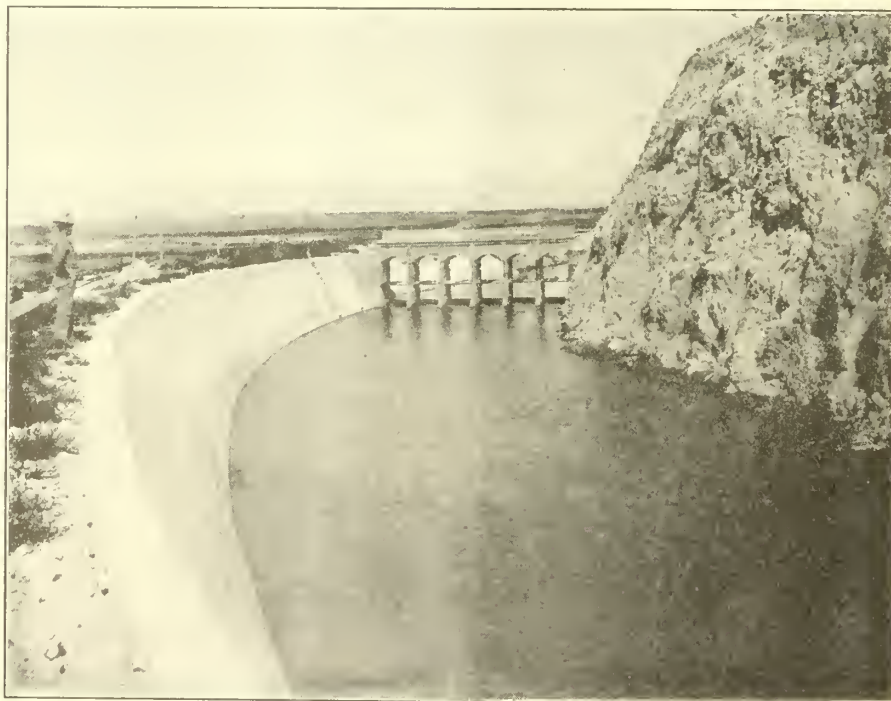
SACRAMENTO VALLEY SURVEYS CONTINUE

An additional expenditure of \$30,000 has been made available to continue the investigation to determine the feasibility of shutting off the flow of salt water, due to tidal action, up the Lower Sacramento and San Joaquin Rivers in California by means of a dam at Carquinez Straits.

Under a contract signed by the Secretary of the Interior and the California Department of Engineering and Irrigation, the State will contribute \$15,000 to continue the investigation, and the Bureau of Reclamation will put up a similar amount.

It has been shown that satisfactory foundations for such a dam can be secured. The continuance is to make the survey, and to prepare the plans and estimates for navigation locks. If regulation by this means is not feasible, litigation to restrict the use of water in irrigation on both rivers, now temporarily suspended, will be resumed by irrigators and property owners in the delta of these two rivers. On the other hand, if such regulation is feasible, it will permit practically the complete use in irrigation of the water of both streams, and a lessening of the uncertainty as to what can be done in the dry season.

Up to this time approximately \$50,000 has been expended on the investigation.



Wasteway on the Interstate Canal, North Platte project, Nebraska-Wyoming

NEW

RECLAMATION ERA

VOL. 16

MAY, 1925

NO. 5



YAKIMA APPLES

The gross value of this crop on the Yakima project, Washington, amounts to several millions of dollars annually

FARMING is a highly competitive business. The efficient farmer will succeed; the inefficient farmer will ultimately fail. Sound business methods applied to farming will increase and stabilize the farm income and elevate the standard of living on the farm. A well-balanced and efficient agriculture which supplies an even and dependable flow of products for which there is an effective demand will benefit both producer and consumer.

*HON. W. M. JARDINE,
Secretary of Agriculture.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

MAY, 1925

No. 5

SECRETARY WORK AND DOCTOR MEAD DISCUSS RECLAMATION

Meeting at Chico., Calif., provides opportunity to point out present policies regarding the future development of irrigation projects based on the new reclamation legislation

SPEAKING before the Rotary Club of Chico, Calif., on April 8, Secretary Work is quoted in the Chico Daily Enterprise as emphasizing the success that has attended the Durham colonization project, which was begun and developed by Doctor Mead, and stating that this is the focus from which similar schemes should radiate. The Secretary stated that the Department of the Interior had inaugurated a new policy of Federal reclamation which is not content merely with the construction of a dam or an engineer's scheme.

"The first purpose of reclamation is to furnish homes for farmers in the semiarid regions," he is quoted as saying. "I bring a message of hope, rather than of discouragement, in regard to reclamation of arid lands, whether it be by Federal authority or by private activity. I am hopeful because we have seen and profited by the mistakes of the past. I think this little colony here of Durham in this beautiful valley will in time be known as the pioneer center of a new policy of settlement which will make Federal reclamation a success."

Doctor Mead is quoted in the same paper as follows:

"I was asked to-night to tell you something definite about the reclamation policy and procedure which has to be adopted in the creation of new projects under the legislation passed last year. That legislation made a very radical change in the procedure, and those changes may not be fully understood.

"The attitude of our department is not favorable to new irrigation projects, because of the fact that in the past there has been pressure in Congress to have new areas taken under this policy before the old areas are taken care of. We have a large number of unfinished projects. It is the policy of the Secretary of the Interior, and it is the only wise policy that can be adopted, to complete those projects before any new projects are begun.

"If that is carried out strictly it means no new projects will be adopted for the next 10 years. It will take all the revenue

that can possibly come into the fund to complete those already established.

"If there are to be any exceptions to that, I think it will be as to projects of the character of this one you are interested in—projects that are small in area, and small in the amount of money that is involved. I am quite sure that policy will not be departed from for some time at least, except for projects of this character—small projects that will not make serious inroads on the fund.

"If this project proves of such a character that it will warrant a departure from that general rule, then these steps will have to be taken: First of all, the boundaries will have to be fixed; then there will have to be some kind of organization of the area that will assure the repayment of the money to be expended by the Government. This is going to be watched by Congress more carefully in the future than it has been in the past. The form of organization that is definitely preferred by Congress, and has been stipulated as to all projects adopted in the last two years, is that of a district. A district organization affords the greatest assurance

STATE COOPERATION IN RECLAMATION WORK

Whereas the Federal Government in the act passed by the last Congress appropriating funds for the Interior Department indicated its purpose to require State cooperation in the matter of land settlement in connection with further reclamation development; and

Whereas it is believed that such a requirement will benefit all interests concerned, the Federal Government, the State, and reclamation project itself; therefore, be it

Resolved, That the Seattle Chamber of Commerce declares itself as being in hearty accord with the policy of State and Federal cooperation in respect to land reclamation and favors any suitable additional legislation that may be required to make such cooperation effective.

of repayment of the money that is due, because it is collected by an agency outside the Government and is not subject to influence to secure deferred payments.

"The next thing is that where there is land in private ownership, before any money is expended, the price at which such privately owned land shall be sold in areas in excess of 160 acres shall be fixed under agreement with the Secretary of the Interior. Such a stipulation is in the last appropriation bill, and it probably will be stipulated in future bills. That is done to stop one of the very serious reproaches and blemishes on the operation of the act in the past. There has been a tendency to capitalize the generosity of the Government; to sell land at an inflated price to the unwary settler, so that he has had to pay for the improvements twice—once through the inflated price at which the land was sold, and next in the obligation to repay the Government for its work. That must not be done again. If an agreement as to price can not be reached, then the irrigation will not be commenced.

"The next question is: Is there any reason why the people who own this land should desire a Government undertaking? I think there is. I think that under the new legislation provided for the new projects for which appropriations have been made this year, it is assured that there will be some consideration for the settlers; some organization to enable them to work together, to know each other, to have community life such as has characterized the development at Durham. The terms of payment for reclamation work under the act are more favorable than can be given if the work is carried out strictly as a business enterprise. Under the act as it is now, under any new project, the cost of the work is repaid out of the earnings of the land. The payment each year is to be 5 per cent of the average gross returns from the crops. The yearly repayment is not influenced by the cost of the work; it depends entirely on the revenue derived from the irrigation and cultivation of the land."

ECONOMIC PHASES OF THE VALE PROJECT, OREGON

Committee of economic experts concludes that under certain conditions relative to land classification and repayment on production basis, the project is feasible and desirable

INTRODUCTION

LOCATION.—The proposed Vale project comprises lands in Malheur County, Oreg., adjacent to the low valley lands on the Malheur River bottom, largely surrounding the town of Vale. These uplands, together with the lowlands now within the Warmspring Irrigation District, composed what was formerly called the Malheur project, on which investigations were begun some 20 years ago. Engineering studies of these arid uplands made during the last two years have referred to the area both as Malheur project lands and Warmspring lands. It is now proposed to term the area under consideration Vale project. The irrigation district which is being formed to include the Vale project will be known as the Vale Oregon Irrigation District.

Investigations forming the basis of this report were made at the request of the Division of Reclamation Economics, Bureau of Reclamation. The committee selected to make the investigations consisted of W. W. McLaughlin, irrigation engineer, United States Department of Agriculture, Berkeley, Calif.; G. H. Hogue, assistant engineer, Bureau of Reclamation, Boise, Idaho, and Prof. W. L. Powers, soil technologist, Oregon Agricultural College, Corvallis, Oreg. This committee was assisted by a locally appointed committee from the Vale district consisting of Ralph Holt, Richard de Armond, and Judge D. Biggs, and also by the county assessor of Malheur County, Andrew M. Graham.

The object of the investigation was to determine the agricultural and economic phases of the Vale project and to report to the Bureau of Reclamation the recommendations and conclusions of the committee. The gathering of field data was commenced about the middle of August and completed September 1, 1924.

The committee made use of various reports which had been previously submitted covering various phases of this project. A cooperative report by the State of Oregon and United States Reclamation Service entitled "Malheur and Owyhee projects," published in 1916, contains a digest of this information up to that date. The United States Reclamation Service has since prepared engineering reports covering the Vale project, having included in these reports a preliminary soil survey by Professor Powers and a completed soil survey by H. H. Krusekopf, of the Bureau of Soils, United States Department of Agriculture.

Pertinent local data were furnished by County Agricultural Agent L. R. Briethaupt, of Ontario, and by Charles L. Batchelder, engineer and manager of the Warmspring Irrigation District at Vale.

The scope of the work included a soil survey and land classification, a study of drainage conditions and water requirements, a collection of data as to yields of the various crops grown in this region, a study of meteorological factors having agricultural or economic importance, as well as transportation facilities and rates, markets and market conditions, and a survey of the school situation, taxation, and such other factors as would be necessary in determining the economic feasibility of the proposed project when based upon the provisions of the fact finders act.

CONCLUSIONS

1. The lands selected for the Vale (Oregon) project are mainly sagebrush benches between Jamieson and Malheur Canyon and Harper bench. Supplemental water is provided for 3,570 acres of alluvial wild meadow. The total area is 28,350 acres classified as follows:

2. Class A, 13,960 acres at \$145 construction charge, including drainage; class B, 11,370 acres at \$115; class C, 3,020 acres at \$85.

3. Class A is almost level sagebrush bench land, very desirable for irrigation, both as to surface and soil conditions.

4. Class B includes mainly sagebrush bench land that is fairly suitable for irrigation, but having a more rolling surface or more remote location or imperfect drainage. This class includes meadow lands requiring supplemental water equivalent to the requirement of 3,570 acres of arid land.

5. Class C lands can be irrigated, but are less desirable than class B due to broken topography, retarded drainage, or to some alkali.

6. Class D includes eliminations as high, broken, stony land and hard alkali land called greasewood land.

7. The average cost is \$126.50 per acre to irrigate 28,350 acres comprising classes A, B, and C. The bench land is almost free from alkali and has comparatively good natural drainage.

8. Foothill drains will be required below the bench, and some drainage will be needed in the wild meadow lands if tame grasses and legumes are to be grown. The amount estimated for drainage is \$185,000.

9. The soil is generally of good depth. The compact subsoil of the bench lands

softens under irrigation. It has good water capacity and is well supplied with mineral nutrients.

10. The quantity of water necessary to properly irrigate this acreage has been stored as available surplus annually for some years past in the Warmspring Reservoir.

11. Preliminary surveys and designs have been made for canals and structures to convey the necessary water for the proper irrigation of these lands. The estimated cost of the system complete, including purchase of storage in Warmspring Reservoir and the construction of drainage system, is \$3,587,305.

12. A duty of water of 3 acre-feet per acre, delivered at the land, is considered ample.

13. It is assumed that the Warmspring Irrigation District will be able to establish a clear title to the land occupied by the Warmspring Reservoir.

14. Climate, soil, market, and transportation conditions warrant for this section a high type of agriculture.

15. Stock raising, with dairy cattle as a basis, and hogs, poultry and sheep to supplement, will form a basis for one of the major activities. The feeding of beef cattle on meadow lands will continue to be an industry. Conditions are favorable for growing fruits and berries for home use.

16. The cash-crop farmer will find a lucrative field in the growing of clover seed, alfalfa seed, hay, corn, potatoes, lettuce, beans, cereals, and other staple crops.

17. Under such types of farming as enumerated the estimated average return per acre will be \$37.50. Hence it would take about 67 years to pay out the construction after payments begin. Estimated returns are based on the following per acre yields:

Alfalfa hay	 tons	4.5
Wheat	 bushels	35
Barley	 do	50
Corn	 do	45
Clover seed	 do	4.5
Potatoes	 do	225
Beans	 do	15

Other crops in proportion.

18. The size of the units should vary from 20 acres to 80 acres for intensive farming, and not to exceed 160 acres for the limited area of meadow land suitable for cattle feeding only.

19. The development of this area will require approximately 500 settlers.

20. The preparation of land for irriga-

tion, including farm ditches, will vary from \$10 to \$30 per acre.

21. A 40-acre dairy unit, fully developed and equipped, will cost about \$7,500 from sagebrush to a fully-developed farm.

22. A good settler with \$5,000 capital and a loan of \$2,000 from the land bank during the second year will have a solvent undertaking.

23. A settler with \$2,500 capital will have great difficulty without assistance other than is now provided.

24. A settler with \$2,500 taking a farm all cleared and one-half planted to perennial legumes can succeed with the aid of the land bank.

25. Very little, if any, of the land having no water right is mortgaged.

26. The tax rate of Malheur County for 1923 averaged, for farm lands, about 31 mills, based on an assessed value of improved lands at \$70 per acre, which is approximately 45 per cent of their market value.

27. All but about 15 per cent of the land is in private ownership; 38 per cent of the land is owned by two companies; 15 per cent of the land is owned by 15 individuals; 20 per cent is owned by 39 claimants; 7 per cent is owned by 30 persons.

28. Seventy-five per cent of the land which is held in private ownership would have to be subdivided under the terms of the reclamation act, and this, with the 15 per cent of Government land, would give at least 90 per cent of the total area requiring subdivision.

29. The privately owned land, exclusive of that now having a partial water right, could probably be purchased at \$5 to \$7.50 per acre. It is, however, generally understood that a large majority of the owners, including the owner of the largest tract, will dispose of their holdings in such units and at such prices as may be designated by the Secretary of the Interior. There are on file in the Boise office of the Bureau of Reclamation numerous letters signifying the willingness of landowners to agree to these terms.

RECOMMENDATIONS

30. Your committee recommends:

(a) That contract for purchase of storage water be drawn so as to protect the Bureau of Reclamation from contributing damages due to seepage from bench lands in consideration of foothill drains constructed for Warm Springs Irrigation District.

(b) That the same contract stipulate the amount that shall be expended in the form of drainage for land of the Warm Springs Irrigation District, which amount shall apply on the purchase of storage.

(c) That the Bureau of Reclamation file on waste water rising from irrigation of bench lands by the bureau's canals so that a charge may be made by the proposed Vale Oregon Irrigation District for drainage provided by foothill drains, particularly on Willow Creek, and that return waters may be available for partial irrigation of pasture.

(d) That long-time credit be extended to new settlers.

(e) That a competent agriculturist be employed to aid and assist the settlers.

(f) That the Secretary of the Interior fix the prices at which excess holdings are to be disposed of to settlers.

(g) That provision be made for clearing and preparing a portion of each farm unit by the Bureau of Reclamation prior to settlement.

(h) That settlers be selected in accordance with their experience, capital, and other desirable characteristics.

(i) That one irrigation district be formed to include all the lands in the proposed project.

The committee concludes, on the basis of the above facts and recommendations and under the proposed law providing for classification of land and for repayment of construction charges at the rate of 5 per cent of the gross annual returns, and in view of the relief which would be afforded to, and is an imperative and immediate need of the Warm Springs Irrigation District, that the project is feasible and desirable.

W. W. McLAUGHLIN,
Irrigation Engineer.

G. H. HOGUE,
Assistant Engineer.

W. L. POWERS,
Soil Technologist.

LOCAL INDORSEMENT

We have carefully reviewed the conclusions and recommendations of the committee on the Vale project and we respectfully submit the following:

We think that the committee is conservative in section 17 of its conclusions in the estimated average return per acre, especially on the yield of alfalfa hay, corn, and potatoes. These yields will be higher most years. The average gross annual return estimate of \$37.50 appears a fair figure based on present prices for farm commodities, but this figure should be materially increased as years go on and the land is brought into a high state of cultivation and production. We estimate that the settlers should be able to repay the Government the construction cost within 60 years.

We recommend farm units from 20 to 80 acres. On the small units fruits can be raised along with dairy cattle, hogs, and poultry, especially near the Jamieson end

of the project, which is a proven fruit section. Most of the farm units should be about 40 acres and ranging up to 80 acres for intensive farming. Dairying should be the chief industry. The basic crops should be alfalfa and clover hay, with dairy cattle, sheep, and hogs sufficient to consume practically all the forage crops raised. Alfalfa and clover seed are both good cash crops. Corn, potatoes, and small grains can be produced profitably as rotation crops following alfalfa or clover. Inasmuch as this project is surrounded by a large acreage of range country suitable for grazing livestock, we believe the running of range stock would be profitable, and to care for this industry some of the farm units should be as large as 160 acres.

It is difficult to determine the price of raw land in the Vale project, as few sales are being made. The sales indicate a price of \$5 to \$20 per acre, and these prices appear to us as about the real value for colonization purposes with due consideration given for location, quality of soil, etc. The colonization of these lands should be safeguarded from speculation by the Secretary of the Interior fixing the size of the farm unit and the sale price and requiring that all excess holdings be offered for sale immediately after water is available. A large number of landowners have already signified their willingness to do this by letters which are now on file in the office of the Bureau of Reclamation in Boise.

With such a large area of raw land, it will be necessary to use every possible means to have the lands colonized rapidly and put into a state of production. With so much of the land in private ownership, it will be difficult to select all settlers, but we recommend that this be done as far as practical. We heartily recommend the employment of a competent agriculturist to aid and assist the settlers.

We recommend that provisions be made for clearing, fencing, and seeding to alfalfa a portion of each farm unit by the Bureau of Reclamation *wherever requested by the landowner*. This appears to us as a very important matter as it will make it much easier for the prospective settler to get started on a paying basis, and the work will provide employment for other settlers who may have some spare time or be in need of cash.

A good settler with a capital of \$4,000 should be able to bring a 40-acre unit into early production successfully provided he could obtain a loan from the Federal land bank as soon as a good portion of this land is under cultivation. The average settler will probably not

(Continued on p. 68)

THE DEVELOPMENT OF OUR UNUSED AND IDLE LAND

Wisdom demands that the Nation look about for the needed additional lands to supply food for our increasing population. To supply this demand the millions of acres of desert and swamp land will yield abundantly when reclaimed

THE following extracts from a recent report on a proposed development point out clearly the need for a comprehensive plan of reclamation of arid, cut-over, and swamp land to provide food for the normal increase in population.

In making a study of the advisability of putting so many acres of new land under cultivation, there must be kept in mind the fact that the last part of the great West has passed into history, and that future tillable soil must come from irrigating our arid lands, draining our swamps, or clearing our logged-off areas. The world's population is constantly increasing, while the limit of the tillable area has been nearly reached.

In the rural districts of the United States the yearly increase of population is about 600,000. These young people know farming, and farming ought to be made profitable enough to induce them to remain on the farm. It will require approximately 100,000 new farms each year to satisfy such a need. The demand for agricultural lands is to be so great, and available lands that offer a reasonable chance for agricultural success so scarce, that rapid settlement of the more attractive areas may be definitely predicted.

If the entire twenty to thirty millions of remaining irrigable acres in the United States were reclaimed, the normal increase in farm population, requiring annually 100,000 farms, would settle such an area in half a dozen years, if the settlement

were thus concentrated. President Coolidge, in his letter to the Farmers' Conference, November 17, 1924, points out that we are already importers of foodstuffs which we ourselves should raise. Much is heard concerning the surplus of foods being responsible for the low prices received by the producer. The trouble is not that we as a nation are raising too much, but that producers of foodstuffs have no satisfactory selling organization. Existing conditions compel farmers to accept prices offered, while the speculator secures the handsome difference between what the producer gets and what a consumer pays.

The remedy is not to be found in importation of foodstuffs that are produced by cheap labor in foreign countries, but in a selling organization that will secure a reasonable price for the producer and guarantee a fair price to the consumer. The welfare of the country demands more and better food, especially for growing children. It matters little how much food is available if the price is such that the masses can not enjoy it. The amount consumed will be small.

As much farming land is being abandoned and going back to jungle and forest annually as is reclaimed by irrigation and drainage. The poorer lands are constantly being exchanged for more fertile ones. Business men frequently quit a poor location and move to a better one. Why should not the farmer leave his worn-out nonproductive lands and move

to those that are fertile? Many talk about abandoned farms. They ought to be abandoned. Many of them ought never to have been deforested. Baker wisely says: "The trend of the land utilization in the United States is toward the more intensive utilization of more fertile or more favorably located lands and toward less intensive utilization of less fertile or less favorably situated lands." Practically all the land that is easily available for agricultural purposes is now under the plow. Only by draining and reclaiming the wet lands, by clearing cut-over lands, and by irrigating desert lands can the producing area be increased.

The late Henry E. Wallace, Secretary of Agriculture, basing his estimate upon statistical information, stated that the population of the United States in 1950 would be 150,000,000. Dr. Raymond Pearl, specialist in vital statistics at Johns Hopkins University, in an article on "World overcrowding," estimates a population of about 150,000,000 in continental United States in 1950. Over the 1920 census, this is an increase of nearly 45,000,000. The Census Bureau estimates a population of 120,000,000 in 1930, about 15,000,000 over the population of 1920. To provide food for the normal increase in our population, not counting immigration, the Secretary of Agriculture estimated that it would be necessary to bring under cultivation 8,000,000 of acres per year, or approximately 240,000,000 of acres between now and 1950 (Yearbook of 1921).

"Improved land increased less than 5 per cent from 1910 to 1920, as compared with 15 per cent to 50 per cent of previous decades, and this 5 per cent increase was practically confined to the precariously productive semiarid lands of the Great Plains region. The land in the United States suitable for agricultural uses without irrigation, drainage, or heavy fertilization, is nearly all occupied. Consequently, one of the great questions before the American people is how to maintain the supply of foods and fibers for the increasing population at the high level to which we are accustomed." (O. E. Baker, Agricultural Yearbook for 1920, p. 409.) Wisdom demands, therefore, that the Nation look about for the needed additional lands to supply food for this increasing population. To supply this demand, there are about 110,000,000 acres of desert and swamp lands. The soil is rich and will yield abundantly when reclaimed.

ECONOMIC PHASES OF VALE PROJECT

(Continued from p. 67)

have a capital of over \$2,500, and for him to succeed it will require that this land be partially in crop when he starts so that his farm will furnish him a living while he is bringing the rest into production.

If the settler starts off with his land partially in alfalfa and the Federal land bank will make a loan on the farm as soon as a good portion is in cultivation, it does not appear necessary for the Bureau of Reclamation to extend additional long-time credit. A great deal depends upon the attitude of the Federal land bank toward loans on a new project. If they will not make these loans or loans of sufficient size to help the settler over his development period, some other agency for extending credit will be required.

We believe the project is entirely feasible and will be able to pay out successfully under the proposed law providing for classification of land and for repayment of construction costs at the rate of 5 per cent of the gross annual returns. The relief afforded to the Warm Springs Irrigation District will go a long way toward solving their financial difficulties.

The banks and business men of Vale and vicinity will do all in their power to cooperate with the Bureau of Reclamation in the development of the Vale project and toward the successful colonization of it.

Respectfully submitted.

DALTON BIGGS,
R. H. DE ARMAND,
RALPH A. HOLT,

Local Committee on Vale Project.

AN IRRIGATION SYSTEM THAT ELIMINATES WASTE WATER

Newton Hibbs, of Twin Falls, Idaho, presents the following interesting statement regarding the application of irrigation water to crops by a system that eliminates waste water

IT is most important to allot and deliver to the land the minimum quantity required to procure the highest return for the water regardless of maximum possible production of the land. Necessity will then force extreme conservation on the part of the farmer.

Several years of experience in power pumping at a high cost made me a water conservationist. I learned to apply the irrigation water evenly to every unit of the field and to waste none of the costly crop requisite.

The fact that waste water causes great loss of fertility from the soil through which the water drains, waterlogs the catch-basin areas, and causes great expense of drainage makes the elimination of waste water a matter of great economic importance.

Nobody will dispute the logical fact that the determination of the crop demand is practicable under all conditions of soil structure, topography, and climate. Also that infinite care and labor would make even distribution of the allotted water possible. And if no more water is supplied than the crop demands and consumes, there will be no waste water. Economy of distribution then becomes the only problem to be solved to eliminate an estimated 10 per cent waste of the present irrigation methods.

As a matter of fact, I have demonstrated economy of distribution while permitting no waste in fields under many varying conditions of topography. On steep fields I run supply ditches without grade, like terraces, on the slopes distanced apart to be most convenient for corrugation water runs. These terrace ditches are permanent with flat side slopes. The corrugations row-distances apart extend between terrace ditches.

The water is dropped from one level to the other through the corrugations between the irrigated rows. The terrace ditches distribute the water to the corrugations over tufts of sod used as head-gates for diversion. Blue-grass sod is the best diversion gate for equal distribution of small row-flows of irrigation water. Tufts of sod used for water diversion grow and become permanent. This sod distribution appliance is cheaper and better than any other diversion appliance known to me.

This terrace example is used here to illustrate my general system of water distribution. If the field is not steep I would prefer water row runs of about 250 feet between these terrace ditches. If the field is steep or has uneven planes the

water run must be determined by topography.

When the terrace supply ditches are once "set" the sodded diversions automatically control the waste water. The sod "sets" are permanent for one season and practically so from one season to the next. Water turned in the higher terrace and redistributed in succeeding terraces to the row corrugations is automatically regulated in quantity at every terrace ditch to meet the demands of every row corrugation below. One man can efficiently attend four 10-acre fields with appropriate water heads during the time required to irrigate such fields, unless the field grades are very irregular, and the row runs are necessarily very short.

To save time and water I provide a distribution trench at the border of the field to dam any water that might waste from neglect. From this foot terrace I make every corrugation a ditch in which the would-be waste water may back up in all trenches which are not supplied with water of equal amount from above. The higher sections of the field, while requiring regulation, may be evenly irrigated before the water is shifted to the next lower section. Any excess of water in different corrugations will be taken up by the next lower terrace for redistribution, but the flow is readily made practically even in all corrugations by timely regulation at the point of the row diversion.

When the distribution of water is effectively under control the cost of irrigation of fields of uneven grade is not greatly excessive. It is more expensive to install an automatic system of distribution for rough fields than for smooth fields, but the cost of irrigation is not great in any common case.

To make this effort more comprehensive I might describe my system of distribution as a system of terraces whether the field is level or steep. The water is run through corrugations in short runs and redistributed to a lower corrugated section of the field. From one terrace the water is dropped to the other in small streams, so small that even the cultivated soil will not be "washed." This flow should be regulated according to grade. When the rows have all been evenly irrigated in one section of the field the water will be dropped to the next lower terrace ditch, by a supply ditch, but not through the corrugations.

Such a distribution system may be cheaply constructed by ordinary plows and corrugators, and no technical labor is required. The grade of the corrugations is not important, and the water affords the best level for the terrace ditch construction.

The combined value of crop and livestock production in the United States last year was \$12,404,000,000, which was \$56,000,000 more than in 1923 when the total value was \$12,348,000,000.



Thinning sugar beets on the Strawberry Valley project, Utah

PLAN FOR CURBING RECLAMATION LAND SPECULATION

Kirk Bryan, geologist of the Geological Survey, describes a plan to check speculation in land, pyramiding of prices, and like evils in connection with the development of proposed new projects

OBVIOUSLY the easier projects have already been built, and those now in contemplation involve large expenditures. One of the difficulties that any project faces is undue speculation in land, a phenomenon common to all projects and deprecated by all students of the subject.

In meditating on these matters it seemed to me probable that many of the projects now in contemplation and under investigation would never be feasible in our day unless a suitable device can be found for checking speculation and obtaining at least part of the construction charges from the increment in value of the land. The object of the United States in undertaking reclamation projects is, according to the reclamation act, "to create farm homes." The object of a settler is, however, more complex, for he wants not only a farm home, but he also wants to make money and to have security in his possessions. Accordingly he desires to own his land and to have the right to sell it at a profit. However, when a settler sells at a profit, the object of the United States is more or less jeopardized, for the farm home is then occupied by a new settler burdened by a larger capitalization, who is thereby less able, either to pay the Government lien or to participate to the fullest extent in the progressive life of the community. With every such sale the burden of overcapitalization increases until the farm is in the hands of a man who operates on too slender a

margin of credit. If in this process of selling for a profit the real value of the farm is overestimated the buyer is doomed to bankruptcy. It is, therefore, to the interest of the United States, and likewise to that of the community, to curb speculation and to prevent as far as possible too rapid transfer of land. The United States thereby will insure its lien and obtain permanent and experienced farmers in its farm homes; the community gains in prosperity by the experience and tenure of its farmers and their freedom from too great a burden of debt. However, the measures taken to curb speculation should not prevent necessary transfer nor wholly prevent the settler from making a fair profit on the increase in the value of his land.

The proposed plan is not a complete plan for repayment of construction charges, but will be useful as a supplementary aid to any scheme of payment that may be adopted. It is simple and requires little machinery for its operation, and consequently will not increase materially the overhead cost of reclamation. It can be adapted to any proposed system of organization of the proposed project, but in the following paragraphs it is assumed that the current method of Federal reclamation to assess construction and operation charges pro rata on each acre involved will be used. In the last section of this paper, the application of the plan to the so-called district system of organization is outlined.

Under the proposed plan a contract will be made with each landowner under the project or with each entryman on the public land included in the project, providing that in the event of transfer of the title, except by inheritance or court order, a part of the construction charges will be paid to the Government. Transfer by gift, or purchase, or by a purchase contract shall be considered as transfers. The sum to be paid will be specified as a percentage of the construction charge in dollars per acre, and the Government will agree that the project superintendent or other official will give a certificate in writing, without additional cost, that the required money has been paid. In order to allow transfer in the period of construction before the total construction charges are finally known, the estimated charges will, for the purposes of this contract, be assumed to be correct. Payments made on these transfers will be credited to the land and will reduce the Government lien by their actual, not their percentage, amount. When the Government lien has been extinguished these assessments on transfer will automatically cease.

In those reclamation projects in which each landholder signs a contract for water right, the contract outlined in the preceding paragraph will be merely a part of the main contract, which will provide for regular annual repayments according to the present practice.



Bee keeping is a profitable undertaking on many projects. Here is part of an apiary on the Shoshone project, Wyoming

OPERATION OF THE PLAN

The plan is so simple that no administrative force will be necessary to operate it. Once the contract is signed, a clear title to the land can not be given until the terms of the contract have been fulfilled and the assessment, or, in other words, percentage of the construction charges has been paid. The money can be received and certificates of payment issued by officials already in existence on any project. The enforcement of payment, however, is provided for by local machinery by which similar restrictions that "run with the land" are enforced.

The effect on land speculation should begin before the project is undertaken, for landowners will realize that transfer before the contract is signed will save part of their profits. They will, therefore, as soon as the project seems certain, be anxious to sell and to sell to bona fide and qualified settlers so that the land may not come back to them for resale.

Similarly, after the project is started, owners will be induced to retain their land rather than lose part of the profit in selling. On the other hand, unless the percentage demanded as an assessment for the right of transfer is excessive, transfers for valid reasons can take place with ease and without bunglesome machinery.

That attempts will be made to evade payment is a foregone conclusion. It will be possible for a transfer to take place and for a quit-claim deed to be given and even recorded without a payment being made if buyer and purchaser are in collusion to evade the payment. But a clear title will not have been given, and the new owner will find that making a second transfer or

obtaining a mortgage is impossible, and he will be liable at any time to a suit for a breach of contract.

THE PROPER PERCENTAGE

The success and effectiveness of the plan depends primarily on the percentage of the construction charges to be demanded with each transfer. Much thought, experience, and local knowledge will be necessary in the choice for any particular project. The writer has no fixed opinion, but suggests that 5 per cent on high-cost projects and 10 per cent on low-cost projects are percentages probably within reason, and can be used here for the purpose of analyzing the effect of the plan.

To take a concrete instance: On the Orland project most of the land was worn-out wheat land and worth a maximum of \$25 per acre as grazing land before irrigation. It sold as bare land for \$100 to \$125 per acre to the new settler. If 10 per cent of the construction charges of \$50 per acre had been assessed on this first transfer, whether it was paid by buyer or seller, there is no doubt that the transfers would have been as well satisfied, and the Government would be that much ahead. It cost from \$20 to \$50 per acre to prepare land for irrigation and to get it into alfalfa. Such land was selling in 1914 for \$200 to \$250 per acre. If \$5 an acre had been assessed on such transfers, it is unquestionable that most of them would have taken place. However, as \$250 is near the value of alfalfa land at any time, later transfers would have been impeded. This is the time in the development of a project when it would be most advantageous to check speculation. As the value of

land approaches its ultimate or average value, the plan works as an increasing impediment to transfers, yet this is the very time when wild speculation boosts land above a true value and loads the farmer with the burden of overcapitalization. It is, therefore, one of the merits of the plan that it becomes most effective in checking transfers at this time.

However, if the spirit of speculation over-rides this hindrance, then we have the comfort that with each transfer the Government lien on the land is being reduced. During the excitement over Egyptian cotton on the Salt River project all sense of normal values was lost. Land was transferred with feverish activity. It sold for more than twice its value for raising ordinary crops. Many farmers sold dairy herds that they had been years in building up to buy additional land for planting to cotton. When the boom collapsed many formerly well-to-do and even wealthy farmers were almost bankrupt. It is doubtful if the plan, had it been in operation, but it would be a gain to the Government and would be to the ultimate interest of the owner to have the land, heavily mortgaged and operated by men almost bankrupt, free of a part at least of the Government lien.

ADVANTAGES OF THE PLAN

Under the plan, failure to pay an assessment at the most clouds the title, and the cloud can be removed by the payment of 5 or 10 per cent of the construction charges. This is a known sum. Whether or not it has been paid can be determined

(Continued on p. 72)



Plowing sugar beets on the Huntley project, Montana

CURBING LAND SPECULATION

(Continued from p. 71)

at any moment either by consulting the project superintendent or the county records. Thus all parties are protected and no orders, proclamations, or lawsuits are necessary to enforce the penalties placed on speculation, for if the amount has not been paid at transfer the Government need only wait until a second transfer or until the owner wishes to mortgage his property.

These practical advantages are far outweighed by the psychological advantages that this plan has over any plan that attempts to prohibit profit in the sale of real estate. Our Puritan forefathers anticipated the profit from the increase in the value of land, and such profits have so long been enjoyed that the right to them is an integral part of our social structure. It therefore runs counter to every instinct of a man accustomed to business under our institutions to deprive him of the right to take the profit in the increased value of land. The new plan does not prohibit the sale of land for a profit, but merely penalizes transfers. The penalty is not so great as to prohibit them until the sale price rises to a point where it yields a small profit only. At times when farm products are down and the faint-hearted wish to sell, the buyers will compel the sellers to pay the assessment. At times of inflation the buyers will have to pay the assessment. The amount of the assessment, however, is small and will usually be no larger than the fee of the real-estate agent. It can not be contended, therefore, that it will prevent buying and selling. Yet with each transfer the land is nearer the ultimate goal of being free of the Government lien.

BUILD UP THE FARM

A farm unit is not a farm, but it holds the possibility of being made into a farm. This fact has often been overlooked by settlers. They have frequently used alfalfa as a cash crop instead of utilizing it to the fullest extent as a farm builder. They have been satisfied with the benefit derived from a rotation including alfalfa, when much greater benefit might have been secured by returning to the soil 80 per cent of the fertilizer value and most of the humus-producing material of the foliage of the plant through the avenue of livestock. Roots and stubble are good for the soil, but roots and four-fifths of the foliage are much better.

THE PLAN UNDER A DISTRICT ORGANIZATION

There is no inherent reason why the principle of the plan of assessment for transfers of land can not be made applicable to projects having this form of organization. Cooperation of State authorities is required, but this help is also a necessary preliminary to any use of the district plan of organization for Federal projects. It will doubtless be necessary for the State legislature to amend the State law under which such districts are organized.

The form in which this provision will be worded will doubtless vary somewhat because of the differences in detail between the laws of various States. In general, however, the amendment should state that all real estate within the boundaries of the district is subject to a special assessment on transfer except transfers by inheritance or legal process; that the assessment shall be a percentage (to be stated) of the assessed value of the land; that moneys derived from this assessment shall be paid into the sinking fund set up to retire the bonds of the district; that this assessment shall be made for every transfer for so long a time as the district has a bonded indebtedness and no longer; that the moneys shall be collected by the county treasurer, or other officer, who will give a certificate of payment subject to record by the county clerk or recorder; that failure to pay the assessment shall be subject to all the penalties applicable to nonpayment of any State or county tax.

The provisions given in the foregoing paragraph are complicated in statement largely because the plan under the district organization is part of a legal system instead of being simply part of a contract between a landowner and the Government. In operation, however, it requires no machinery not already provided by the local governments. No special responsibility will rest on the Federal Government.

The incidence of the assessment is the same, but the application of the money is not so direct as in the other plan of organization, in which the assessment is an

MILK RIVER PROJECT COOPERATIVE BOARD

The members of the local cooperative board on the Milk River project, Montana, are as follows:

Chinook division.—A. G. Middleton, Chinook.

Malta division.—T. J. Larson, Malta.

Glasgow division.—J. L. Truscott, Glasgow.

advance payment on construction charges which are a prior lien on the acreage involved. The parties to the transfer by paying the assessment are relieving themselves of a future liability. The lands that are transferred most frequently are those which will be free of the Government lien in the shortest time. Under the district plan such direct incidence is impossible. The assessment will go to reduce the liabilities of the whole district. On the other hand, the assessment is to be made on the value of the land as assessed for general taxation. As this value is the most sensitive indicator that we have of benefits received or losses sustained, it follows that the assessment will be lightest on those lands that may, because of their poor quality, have frequent transfers and will therefore be penalized the more frequently. On the other hand those lands whose value increases rapidly and which are likely to have numerous transfers because of speculation, will have the heaviest assessment. The increasing assessment for transfers as values rise will tend to impede speculation, the desired object, and at the same time these lands are best able to pay an increased share of the cost of reclamation.

It seems, therefore, that the proposed plan is applicable to either the original organization of Federal irrigation projects or to the district organization.

Crop production in 1924 had a farm value of \$11,404,000,000 compared with \$10,401,000,000 in 1923, but of this value some \$4,951,000,000 worth of crops were fed to livestock, whereas in 1923 the value of crops fed to livestock was \$4,286,000,000.

DON'T MINE THE FARM

Farming is not mining. A miner is not expected to put anything back. A real farmer puts back whatever is required for soil improvement. He does whatever is needed to strengthen the weakest link. Even if the nitrogen content should remain stationary as a result of fixation by bacteria on the roots of alfalfa, selling the foliage off the farm in the form of hay removes other plant foods. That which should be returned goes to enrich the farms of others. Feeding crops on the farm retards depletion. Whether manures are a food or a health restorer, they are necessary, and they turn the trick when they become incorporated with the soil.

ARE DAIRY COWS PAYING?

H. A. IRELAND, associate agriculturist on the Uncompahgre project, Colorado, states that to answer for his own information the above question, R. C. Nash, of Spring Creek Mesa, recently had a 48-hour test made on his herd. The days for the test were set a week in advance, and the test was made at the time set, although two of the cows of the herd were out of condition; so the results ought to be no better than an average. For the two days all the feed of the herd was carefully weighed and the cost computed on the basis of present market prices. Each cow's milk was weighed and tested at each milking. The skim milk and the cream were weighed and tested at each separation, and the cream from the two days was marketed separately. No other milk except that from the cows on test was run through the separator, and no cream from these cows was taken out for household use during the two days. In every respect the test was made as fairly as it was possible to do it. The results were interesting.

The first thing found was that in spite of the utmost care in weighing there was a loss in the handling of 13.3 pounds of milk from a total of 595 pounds produced; that is, the combined weights of the cream and the skim milk lacked that amount of equaling the weight of the whole milk, even though no milk was spilled. The second interesting thing discovered was that the separator was running at least seven times as much fat over into the skim milk as a good separator should do, the fat test of the skim milk being above 0.20 of 1 per cent, whereas 0.03 is the limit of good skimming.

The eight cows used in the test are all grade Holsteins. They average 3 years 6 months of age and have milked an average of 114 days since last freshening. Their average daily production was 37.2 pounds of milk and 1.2 pounds of fat. Their daily feed consisted of 33.6 pounds of alfalfa hay, one-third of which was third cutting and two-thirds first cutting; 12.5 pounds of uncooked cull potatoes, and 5 pounds of ground oats. Hay was valued at \$9 per ton, potatoes at 25 cents per hundredweight, and ground oats at \$2.10 per hundredweight, making the cost of the feed for the two-day period \$4.60. The amount of hay was all that the cows could be made to eat.

The cream was sold at a local cream station at the current price of 40 cents

per pound of butterfat. The private test of the cream checked exactly with the test made by the creamery.



Good dairy cattle mean healthy youngsters

The following table shows in condensed form the results of the test:

Number of cows, 8.
Average age, 2 years 6 months.
Average days in milk, 114.
Average two-day production, 74.1 pounds milk, 2.4 pounds fat.
Weight of whole milk, 595.2 pounds.
Weight of skim milk, 526.3 pounds.
Weight of cream, 55.6 pounds.
Loss in weight, 13.3 pounds.
Computed butterfat, 19.4 pounds.
Butterfat sold, 16.7 pounds.
Butterfat in skim milk, 1 pound.
Butterfat not accounted for, 1.7 pounds.
Estimated value of butterfat, \$7.77.
Amount actually received, \$6.68.
Cost of feed for two days, \$4.60.
Profit above feed cost, \$2.08; ¹ \$2.40.
Profit per cow per day, \$0.13; ¹ \$0.15.

Stated in another way, the cows, with butterfat at 40 cents a pound, are paying 25 cents a hundredweight for cull potatoes, \$2.10 a hundredweight for ground oats, and \$16.70 a ton for hay which would be increased to \$17.90 a ton with the cream separator working properly.

¹ Profit if loss in skim milk stopped.

When butterfat was selling for 35 cents a pound there was a general feeling that there was no profit in milking. Mr. Nash found that 26 cent butterfat would just about pay the above prices for his feed. He figures the skim milk, calves, and manure against his labor and other expenses, except the feed.

It should be understood that these figures apply only to cows of this particular test. There are other cows not far from here that would not make a profit on anything. On the other hand, there are cows that might show up better than these, and it may be that Mr. Nash's herd would make a better showing with different feed.

Five of the cows in this herd are heifers sired by a bull sold recently for \$16. Mr. Nash bought him as a calf for \$200 and thinks he got a bargain.

In 1916, Thomas F. Grim, a Montana homestead entryman, with his wife Rosie Grim, executed a mortgage upon the homestead before patent had been issued. Afterwards Thomas F. Grim abandoned the entry and relinquished it to the United States, the Grims were divorced, and in 1920 Mrs. Grim made homestead entry for the same land and in due time received patent therefor. In a suit to foreclose the mortgage, the wife contested the validity of the mortgage. The Supreme Court of Montana held the mortgage to be good under the circumstances. (*Lohman State Bank v. Grim* (Mont.), 222 Pac. 1052.)

SAND SLUICING ON THE RIO GRANDE PROJECT

Measures to cope with the conditions have consisted of improvement of diversion facilities, increased velocities in the main canals, and the establishment of long crest weir structures at turnouts from the main canals, as described by Project Manager Lawson

THE average amount of sediment carried by the Rio Grande, as determined by analyses over a large number of years, is 1.7 per cent—almost twice that of the Colorado River at Yuma. This fact largely influenced the design of Elephant Butte storage dam of the Rio Grande Federal irrigation project, and made necessary the creation of larger storage capacity, in order to take care of the effect of the deposition of the sediment in reducing the reservoir capacity. Practically all of this sediment is now deposited in the upper reaches of the reservoir, and the discharge from Elephant Butte Dam for irrigation purposes is free from silt and sand brought down from upper river sources.

This silt was in such finely divided particles that it was transported principally in suspension, and for this reason was difficult to separate from the canal water supply, either by surface skimming, under-sluicing or periodic sluicing through limited area settling basin methods. It deposited in the bottom and on the berms of the canals in strata, and once set, required team or machine methods to remove. Because of its tendency to remain in suspension a large percentage of it was formerly carried by the water out into the farm ditches and even spread over the entire area irrigated. With Elephant Butte Reservoir in operation, the silt now settles out in storage, and the canal and lateral maintenance problem on the Rio Grande project has changed from the annual removal of silt from canals and laterals to that of preventing the deposition of sand.

Unlike the finer silts, the movement of the sand is more a rolling along the bottom of the channel than being carried in suspension, and while the silt moves at the velocity of the water, the sand movement is much slower. The principal difference, however, which influences the methods of handling and makes it possible under favorable conditions to hydraulically control the amount of sand entering the canals, or to remove it after it has entered, is that while the sand "settles" more rapidly with a decreased velocity, it does not become bedded or "stay put" as the silt does. As long as there is sufficient velocity to move the sand at all, there is a constant drifting, or rather rolling of it down the channel, and even though it does become temporarily lodged, it is easily set in motion

again and can be "picked up" or cut out by a proper increase in velocity. Practically none of the sand is carried on the fields with the irrigation water, that getting into the smaller laterals or field ditches soon settling in them.

These characteristics of sand movement on the Rio Grande project have led to two general schemes for the hydraulic control of sand in the irrigation canals; first, to prevent as much of the sand as possible entering the canal by settling basin and skimming weir arrangements at the diversions, and, second, the removal of it from the canals by sluicing through wasteways. The success attained by each is proportional to the amount of water available for waste and sluicing purposes and to the differences in head. Cleaning sand from canals by team and machine methods is not only expensive, but often difficult, and sometimes involves right-of-way trouble. One of the peculiarities of the sand problem is the rapidity with which certain sections of the canals sand up (usually near the head), thus crippling the capacity of the entire system. By a proper manipulation of check gates and the canal flow, an accumulation of sand may be cut out of one stretch of canal, only to settle in another section, but by a repetition of this performance it can eventually be carried to a wasteway if a suitable one is available.

SLUICING AND SKIMMING ARRANGEMENTS AT DIVERSIONS

The diversion on the Rio Grande project now provided with special settling, skimming, and sluicing arrangements is the Franklin Canal heading, and this has been a development to meet changing contingencies. This diversion makes use of the old Mexican Diversion Dam, and when the canal was first reconstructed rather than to follow out the customary arrangement of placing sluice gates in the old diversion structure directly in front of the headgates, an enlarged canal section for a distance of 600 feet below the headgate was made for a settling basin, at the lower end of which the sluice gates were placed. As the sand conditions developed and the river bed itself built up below the diversion, almost eliminating the difference in head required for successful sluicing, the sluicing facilities became inadequate and the canal sanded to such an extent that it was only possible to secure a diversion of around 100 second-feet in a canal designed

for 400 second-feet. With these conditions to contend with, it became necessary to raise the sides of the settling basin and to provide greater capacity to the head and sluice gates, so that sufficient water could be passed through the basin during sluicing periods to move some of the accumulated sand deposit, the movement being accomplished as much by the volume of water as by the remaining slight difference in head through the sluice gates. In addition, arrangements were made to take off the irrigation supply by skimming the surface water from the basin over a long weir along one side.

With these improvements installed, and by sluicing one hour each day, it is now possible to supply as high as 350 second-feet through the canal. The frequent sluicings are necessary because it is only possible to move about 1.5 feet of sand from the settling basin at a sluicing, on account of the limited difference in head available.

Following are the principal points to be observed in an improvement of the layout. The sluicing gates and skimming weir are located on opposite sides of the settling basin, near its lower end. This arrangement will not move the sand from directly in front of the weir during sluicing. The sluice gates should be adjacent to and at approximately right angles with the weir at the lower end of the settling basin. The adjustable portion of the weir consists of a steel shutter, sliding past the front of a low concrete trapezoidal weir on the settling basin side. Sand settles against these gates, and because of the lack of sufficient head to remove it all by sluicing they can not be lowered into the sand to adjust the weir crest.

Percha Diversion Dam is the first diversion below Elephant Butte Reservoir, and the river has not accumulated an appreciable load of sand at this point. However, daily sluicing is practiced, and sand is thereby practically eliminated from the Rincon Canal system. This dam is the highest of the diversion dams of the project, and the sluice gates are set to the lower level, making this the only diversion where effective sluicing without special arrangement can be practiced. The height of the dam and the elevation of the headgates above the sluice gate sills and floor provide an ample settling and sand storage sluicing basin without special design for one.

At Leasburg Dam the canal headgates are set in a rock cut section of the canal, about 60 feet from the east abutment of the dam, and the sluice gates are located in the entrance channel at right angles to and adjacent to the headgates. An ideal wasteway is located approximately one mile below the heading at the dam, and it is by this that most of the sluicing is accomplished. The waste gates are set four feet below the theoretical grade of the canal, making in effect a settling basin of the first mile of canal.

Mesilla Dam is the radial gate type of crest. No special skimming or sluicing arrangements are provided, except that the two gates next to the headgates on each end have lower sills for sluicing purposes. There is not a great difference in head through the dam, and the diversion of a great per cent of the water through restricted undershot headgates makes the sand problem at this point a particularly annoying one.

The sand problem, however, reaches its most serious proportion in the several diversions without dams or sluicing facilities below El Paso. Here, as the lower end of the project is reached, the situation resolves itself to that of diverting the water with a minimum of waste, and the available sluicing water becomes less and less in proportion to the diversion use. Furthermore, the generally high river bed through the valley precludes the possibility for effective sluicing through wasteways. Flatter canal slopes add to difficulty in keeping sand moving through them.

REMOVAL OF SAND FROM CANALS BY SLUICING THROUGH WASTEWAYS

Where the country slope and topography will permit, the grades of the canals

and main laterals have adjusted themselves to the natural sand slope, or slope on which the sand continues to move with the water flow. This has partially or entirely eliminated many of the grade drops in the original structures, and in many instances has necessitated bank raising below these structures. Under these conditions the object to be attained is to hold as much of the sand as possible in the main canal, or in such main laterals as have effective wasteways through which the sand can be sluiced.

Special structure types developed to accomplish this end are wide headings with skimming weirs for dead end laterals, or laterals which return their waste into other laterals, and wasteway structures with gates set 3 or 4 feet below the canal grades when there is sufficient head to permit a clear drop. The lateral headings from main canals are long weirs taking off the top water with the least possible disturbance of the canal flow. The usual construction has been a concrete wall part way, with railroad rail flash board guide posts supporting a walk plank or brackets. The crest is of sufficient length and adjustable, with flash boards to take only the top 0.4 to 0.6 foot of water. Since installing such special structures and readjusting the canal grades, success in moving the sand through the main canals has been very gratifying; in fact, removal of the sand by team or machine methods has been very limited and confined to the flatter grade section of the main canals and to smaller laterals not provided with special headings or on flat grades without effective wasteways. If the sand condition continues on indefinitely, however, in as extreme a degree as at present, the wasteways will reach the limit of their usefulness.

The measures so far adopted in keeping main canals reasonably free of sand accumulations by providing improvements in diversions have been reasonably successful in reducing the annual maintenance charge and preventing water shortages by decrease in canal channel capacity. This has been accomplished, however, at the expense of returning to the channel of the Rio Grande, which is the main canal of the project, large quantities of sluiced materials, which, added to that deposited by the river itself, is gradually filling this main canal in the lower portion of the project with accumulations to an elevation in many cases higher than the surrounding farming country.

The complete solution lies in a rectified river channel, with elimination of the meanders and the construction of protected embankments, which will confine the limited flow with a greater slope with such additional provisions in inflows from side arroyos and spillway discharge from Elephant Butte Dam and such surplus water as will duplicate the former scouring action of the large floods in the restricted and regulated channel provided.

The amount of water to apply in one irrigation, the length of the interval between irrigations, and the total quantity used in any one season all depend on a large number of soil, crop, and climatic conditions.

The surface between field laterals should be so evenly graded that water will flow in a thin sheet over the entire surface, the excess being caught up by the lower lateral.

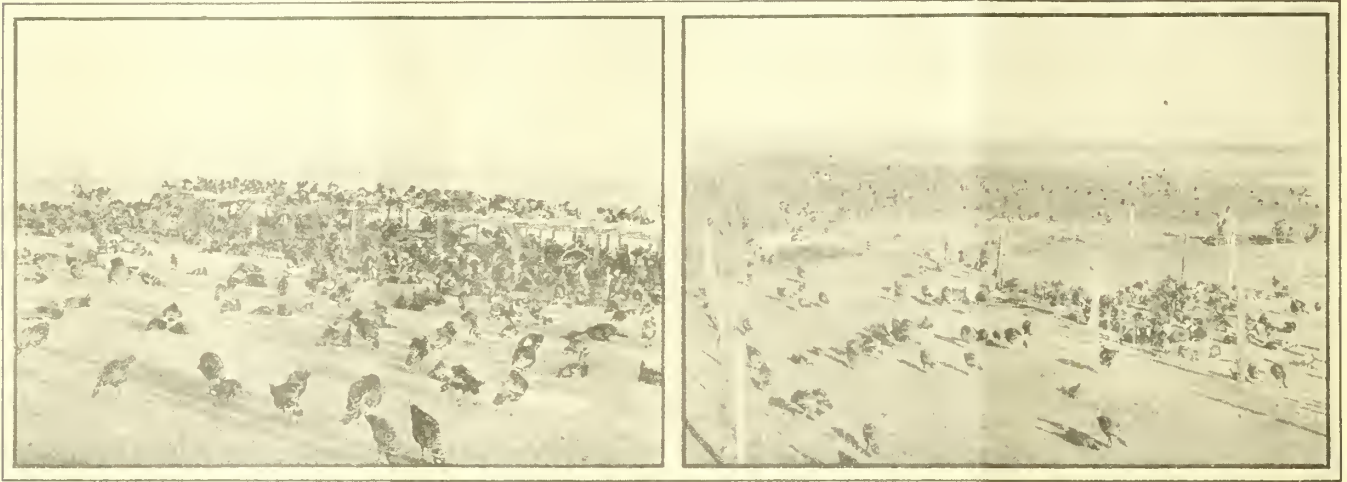
Too much as well as too little moisture in soils injures plant growth.



Annual meeting of the Tieton Water Users' Association, Yakima project, Washington. 450 of the 1,300 members present

BLACKHEAD CONTROL IN TURKEYS ON NEWLANDS PROJECT

L. E. Cline, agriculturist, describes methods used to prevent disease, based on liberal use of pulverized tobacco with an occasional dose of Epsom salts



Left: Outdoor roosting facilities handling large number of turkeys. Right: Fifteen hundred turkeys grown successfully on blackhead infested ground, with the use of pulverized tobacco, by C. L. Crew, Fallon, Nev.

SUCCESS or failure in the production of turkeys on a commercial scale has been dependent largely upon the success of the grower in avoiding the ravages of blackhead disease. Since no proved remedies were available for combating blackhead disease, the fortunes of the turkey grower lay in keeping out of the way of it as long as possible and quitting the business when the disease finally overtook him.

Many a turkey-growing district in the older settled parts of the East has been forced to abandon this profitable industry when this dreaded disease once put in its appearance.

Unfortunately for the turkey grower little progress toward a practical solution of this problem of control was made in the study of the blackhead disease in turkeys until very recently. Many remedies had been proposed for the control of blackhead, but the results from their use were very generally disappointing. Most all treatments were based on the principle of intestinal disinfection and strict sanitation. Whatever good may have come from these methods of treatment can no doubt be attributed to the sanitary measures carried out. Recent investigations show that antiseptics, dilute enough for the turkey to tolerate, can have little damaging effects on the blackhead organism.

New information on disease.—Fortunately for the present-day turkey grower new information has made it possible to make real progress toward combating the blackhead disease. Perhaps the most important step in this progress was made

when some new phases of the life history of the organism causing the blackhead disease were discovered. Recent investigations by Smith and Graybill, of the Rockefeller Institute, and Kyzzer, of Harvard University, indicate that the blackhead organism ordinarily does not produce blackhead disease except in association with the common cecum worm (*Heterakis papillosa*). It would seem, therefore, if our fowls are kept free from this intestinal worm, that there will be little likelihood of blackhead disease.

Tobacco used to combat blackhead.—Acting upon the above suggestions, the writer has made numerous observations during the past year on the effect of combating blackhead disease in turkeys by administering pulverized tobacco as a vermifuge, following the method of treatment for intestinal worms in poultry devised by the California Agricultural Experiment Station, with the idea that without intestinal worms there would be no blackhead. The results of these observations have greatly strengthened the belief in this method of treatment. Turkey growers on the Newlands project in Nevada, who have heretofore met with discouraging losses, claim that with this treatment they have no fear of blackhead.

The first method of tobacco treatment employed here is similar to one of the California methods and consisted in making a tobacco decoction of 1 pound of cheap tobacco and mixing this with just enough wheat bran for 100 birds regardless of size. This was fed after fasting 24 hours. This feeding of tobacco was followed in three or four hours with

Epsom salts, at the rate of 1 pound dissolved in sufficient water to moisten a small amount of bran mash for the same number of birds. This method of treatment proved very beneficial and was repeated as often as seemed advisable. This first method, however, was soon replaced by the more commonly used California method, namely, the feeding of pulverized tobacco, 1 part tobacco to 25 to 50 parts of wheat bran or mill run. This mixture was kept in front of the turkeys all of the time, and according to local experiences they consumed sufficient of the tobacco to keep themselves free from intestinal worms and consequently free from blackhead disease.

Amounts of tobacco used.—The amount of tobacco used by local growers in combating blackhead disease has varied considerably. Fowls seem able to tolerate very large amounts of tobacco. One grower reports good results from administering a good-sized dose of pulverized tobacco and mill run half and half to turkeys in advanced stages of blackhead disease. Another grower reports good results with two 10-day feeding periods with free access to pulverized tobacco, 2 pounds to 100 pounds of mill run, with each 10-day period followed by a dose of 1 pound of Epsom salts for each 100 birds. Other growers feel that it is advisable to keep pulverized tobacco in front of the turkeys continuously at the rate of 2 per cent of their ground feed. The essential items are to feed sufficient tobacco to act efficiently as a vermifuge and to give Epsom salts occasionally to

(Continued on p. 77)

CROP CONDITIONS ON THE PROJECTS

THE following is a brief statement of crop conditions on the irrigation projects of the Bureau of Reclamation, Department of the Interior, at the close of March, 1925:

Yuma project, Arizona.—It is expected that the cotton acreage will be somewhat larger than that of last year. The alfalfa acreage will be about the same. The first cutting of alfalfa was being baled and shipped. Considerable attention was being paid by farmers to improved methods of farming. Bearing trees on the mesa have set a heavy crop.

Orland project, California.—The first crop of alfalfa was ready for cutting early in April. Frosts damaged the apricots to some extent. Spring planting of orchards was about completed.

Grand Valley project, Colorado.—The demand for alfalfa hay fell off, and some farmers were having difficulty finding a market for all of last season's crop. A considerable acreage of early potatoes had been planted. Rain at the end of the month was beneficial to winter wheat and alfalfa and put the ground in good condition for plowing.

Uncompahgre project, Colorado.—The demand for hay remained good, and considerable surplus hay was disposed of at prices ranging from \$10 to \$12 a ton. An additional bonus of 50 cents a ton for the 1924 sugar-beet crop was announced by the sugar company, bringing the total to \$7.50 a ton. The onion market remained steady, and the potato market improved slightly.

King Hill project, Idaho.—The ground was in good shape for the season's agricultural operations, but little preliminary farm work had been done.

Minidoka project, Idaho.—Sugar-beet plantings were comparatively light. The area under contract will, however, exceed 8,000 acres. The high price of wheat tempted many farmers to abandon beet culture for the less exacting work of grain growing.

Huntley project, Montana.—Practically all winter wheat was killed by the cold weather, and the area was being replanted to spring wheat. Some seeding was done, and considerable land had been prepared for seeding.

Milk River project, Montana.—Grain prices declined during the month. No farm work had been commenced.

Sun River project, Montana.—The weather was favorable for early plowing, and farmers were beginning to get the ground in shape for planting. A consid-

erable quantity of alfalfa hay on the Fort Shaw division was baled and shipped. Interest was being taken in sugar-beet culture, and the sugar company, in conjunction with the Great Falls Commercial Club, had hired an experienced field man to assist farmers in taking care of the crop. If a sufficient acreage is signed up, a beet dump will be constructed, with prospects for the construction in 1927 of a sugar factory in the vicinity of Great Falls.

Lower Yellowstone project, Montana-North Dakota.—Soil conditions were favorable, and some seeding of wheat had begun. Considerable hay was left over from last season.

North Platte project, Nebraska-Wyoming.—The soil was in splendid shape, and farmers were busy putting in grain. No satisfactory settlement had been made between the sugar company and the Cooperative Beet Growers' Association on the 1925 contract terms, and the association had recommended that growers plant other crops.

Newlands project, Nevada.—Cut worms retarded alfalfa growth in several localities.

Carlsbad project, New Mexico.—Hay stored on the project sold locally at prices ranging from \$23 to \$25 a ton. Plowing had been completed by the mid-

dle of the month and cotton planting started.

Rio Grande project, New Mexico-Texas.—Cotton will be the principal crop, and 70,000 acres will be planted. A number of growers had contracted to sell the entire season's yield at a price between 24 and 25 cents a pound. Indications pointed to a good fruit crop.

Williston project, North Dakota.—The soil was in excellent condition, and spring plowing had begun. The railroad company decided not to build a spur to shorten the beet-hauling distance, thus lessening interest in this crop, and the sugar company had not made final decision as to dumping facilities.

Umatilla project, Oregon.—Owing to winter killing, the first crop of alfalfa from many fields was expected to be poor.

Klamath project, Oregon-California.—Considerably more hay was left on the project than had been anticipated, and some farmers who were holding for higher prices will be forced to carry the surplus over. Spring plowing was about completed and most of the grain crops had been seeded.

Belle Fourche project, South Dakota.—Preparation of the ground for planting was quite general, and some spring grains were seeded on the sandy soils. Gumbo soils will require more drying. A second bonus of \$1 a ton was paid to the beet growers on the 1924 crop, bringing the total to \$7.50 a ton.

(Continued on p. 78)

BLACKHEAD CONTROL IN TURKEYS

(Continued from p. 76).

flush out the intestinal tract and assist in relieving the turkeys of intestinal worms and blackhead infection.

The beneficial results of this method of combating blackhead have been a surprise to local growers, and they feel that a big step has been taken in saving the turkey industry from annihilation by the ravages of blackhead.

Strict sanitation essential.—Strict sanitary precautions and the liberal use of pulverized tobacco with an occasional dose of Epsom salts will be relied upon by Newlands project turkey growers during the present season.

During the past seven years, practically all the suggested treatments for blackhead have been given a thorough trial by local turkey growers, but it was very evident that none of these remedies, except tobacco, gave any assurance of relief to the grower, other than such relief as might be gained by strict sanitary precautions.

Now, that more is known concerning the life history of the blackhead organism,

especially its relation to the presence of the common intestinal round worm, rapid progress should be made in successfully combating the disease. Experiences of Newlands project turkey growers have served to substantiate the findings of the investigators. In the light of what has been accomplished so far, there seems to be a possibility of utilizing nicotine preparations as well as tobacco itself for combating blackhead.

During the season of 1925 field demonstrations will be conducted on the Newlands project by the Office of Demonstrations on Reclamation Projects for the purpose of determining the feasibility of the use of nicotine preparations for combating blackheads in turkeys, and also to make further study of the amounts of pulverized tobacco to be used and the proper methods of feeding it.

Some very definite information along these lines should be secured during the present year.

SPRINGTIME IS PIG TIME

SPRINGTIME is pig time on most farms. It is the season when more can be done than at any other time of the year to make pork production profitable, for a pig well started may be said to be well on the way to market. After he is a few weeks old and has successfully passed the weaning period he is pretty well able to take care of himself if he is given access to plenty of the right kinds of feed. Therefore particular care should be taken at this time in order to make the job easier later in the season and the profits greater. A pig that grows well from start to finish is always the desirable and most profitable one, no matter whether the price of hogs is high or low.

First of all, the pig in order to be profitable must be well bred and of good type. He must have in his veins the blood of animals that have had the capacity to turn a minimum quantity of feed into a maximum quantity of meat. But even a pig starting with these advantages may be a poor piece of property if he is badly handled or if fed improperly. He may get a bad start in

competition with his litter mates; he may be stunted at weaning time; worms may sap his vitality; the pasture provided may be insufficient for his needs; or, if precautions have not been taken, cholera may whisk him to an untimely and unprofitable end. But among these possibilities there is none that can not be guarded against.

The opinions of hog raisers vary widely as to the age at which pigs should be weaned. Some of them take the youngsters away from their mothers at 5 weeks, others at 12 weeks, and still others may make them shift for themselves at any age between these extremes. In exceptional cases breeders will leave pigs with the sows even when they are more than 3 months old. Unless there is some special reason for so doing, pigs should not be weaned until they are at least 10 weeks old, and a sow that will not suckle her litter for this period is undesirable as a mother and should be discarded from the herd.

Some farmers and breeders wean the pigs at an earlier age in order to get two litters a year, but it may be better practice to give the pigs a stronger start and raise only three litters in two years. It is better to raise fewer pigs and have them well grown than to raise a larger number and have many of them stunted.

When a litter is to be weaned, attention must be given to the sow's condition as well as to the pigs. To bring about a favorable condition for weaning, the quality and quantity of her feed should be reduced for four or five days before the pigs are to be taken away. This will result in a reduced flow of milk and tend to prevent udder troubles. The sow should be removed from the pigs rather than the pigs from the sow; the youngsters being left in the quarters to which they are accustomed and having access to a self-feeder which they should have learned to use several weeks earlier. In case a sow's udder after she has been taken away becomes so distended with milk that it is painful, she may be returned to her family for a short time for relief. It will seldom be necessary to return her more than once.

When the pigs are weaned do not change the ration. Leave them on good pasture, with access to the self-feeder containing corn and shorts or middlings. If during the suckling period, or after, skim milk or buttermilk is added to the ration, commence feeding it in small quantities, gradually increasing it from day to day. Sudden changes are always to be avoided.

If a sow farrows March 15 and the pigs suckle 10 weeks, they will be weaned May 24. If the sow is in good condition she may be immediately rebred; that is, within three or four days after the pigs are weaned. If she were rebred on May 28, she would farrow again about September 16, and the pigs would be weaned November 25, making possible rebreeding for

CROP CONDITIONS

(Continued from p. 77)

Strawberry Valley project, Utah.—Soil conditions were excellent. Practically all spring wheat had been sown, and a good start made on drilling in peas and sugar beets. The condition of fall grain was excellent. Alfalfa fields were turning green, and the fruit trees were beginning to bud. Farmers in general reported the outlook the best in several years.

Okanogan project, Washington.—Prospects of a large apple crop were excellent, with prices still good and a forecast that they will remain so during the year.

Yakima project, Washington.—The alfalfa tonnage will be considerably reduced by winter-killing and many farmers were plowing up their fields for reseeding or planting to other crops.

Shoshone project, Wyoming.—Considerable headway had been made in plowing and preparing the fields for crops. The sugar-beet acreage will be considerably less than that of last year, but contracts had been made with a seed company to raise seed peas on 700 acres at prices ranging from $3\frac{1}{4}$ to $5\frac{1}{4}$ cents a pound, depending on the variety grown.



One of the many prize hogs on the Rio Grande project

March 20 farrow. It is not always possible, however, to keep to such a schedule, and the raising of two litters a year and having them all come at the proper time is impossible. If, however, the pigs are allowed to suckle 10 weeks, it should be easily possible for a sow to raise three litters in two years, and it is probable that more profit would be made this way than by crowding the sows too hard.

The treatment of the sows is just as important as that given the pigs. After they have been taken away from the litters in the spring, they may be put on pasture and given a small quantity of grain, the ration being determined by the quality of the pasture and the condition of the sows. Sows 2 years old or over, weaning spring litters and not being bred for fall farrow, may be successfully carried for two or three months on good alfalfa or clover pasture without grain. Very thin sows, and gilts weaning their first litters, should be separated from the other sows,

QUALIFICATIONS OF A CANADIAN FARMER

Under the subhead "Industry and thrift," a pamphlet issued recently by the Department of Immigration and Colonization of Canada on the general subject of assisted settlement of approved British families on Canadian Government land, stresses industry and thrift on the part of the prospective settler, as follows:

A settler can commence farming in Canada with little personal capital and with small farm experience, and can make good, if he possesses the will to work and applies himself.

The man who is willing to work—when a cash wage is not available, for anything that is of use to him on his own farm—never fails. No applicant will be approved who can not prove clearly, from his previous life at home, that a willingness to work hard has always been one of his outstanding characteristics.

Experience and industry are of little value without thrift. Government assistance in securing a farm and equipment will not mean that any settler can expect more than the barest and most meager living until he has, himself, built up a reserve fund of his own. In the early years severe and rigid economy, which many may regard as almost privation, is the only sure way in which to assure success and substantial comforts in the later years.

Speaking generally, thrift is evidenced in two ways—first, by making a profit, or taking advantage of incidentals; and, second, by avoiding every unnecessary expense. In both aspects, the character and attitude of the farmer's wife are of the greatest importance.

placed on good pasture, and given a liberal grain ration. Usually the thin sows will gain rapidly enough to be taken out within 30 days and placed with those maintained on pasture alone, but it is desirable to feed gilts some grain during the entire period between the weaning of the first and second litters. The management of the brood sow is the best test of the herdsman's skill.

During the early spring the hog raiser should be giving a great deal of thought to pasture for his herd. It offers one of the best possibilities for cutting costs. This does not mean that it is possible to fatten or even to make satisfactory growth on hogs by using pasture alone. For best results, it must be supplemented with grain. Another important fact to consider is that lasting properties of pasture can not be measured out exactly. There must always be a surplus so that it will not be necessary to graze closely. Hog pasture should signify abundance.

So much depends upon the crop used, the quality of the soil, and climatic conditions that it is impossible to say how many animals may be pastured on an acre, but ordinarily an acre will furnish pasture for from 5 to 15 hogs averaging 100 pounds. A good plan is to provide two pastures for a single bunch of hogs, alternating the use of them. In this way fairly close pasturing may be practiced and succulent feed provided. Pasture crops which are allowed to mature do not furnish good feed for hogs. When seed is about to form the field may be clipped to restore succulence.

In considering pastures, it should not be forgotten that the manure from the hogs, which is evenly spread, is of great value in building up the land.

The value of good pasture for breeding animals is hard to overestimate. It provides desirable feed, and in obtaining it the animals take the exercise which is so necessary to best development.

In most all hog-growing sections permanent pastures are generally used, but these permanent pasture grasses are not desirable except in inclosures where the hogs have comparatively wide range. Where small lots are used or a considerable number of hogs are kept, it is always advisable to plow up such lots or pastures once or, better, twice a year. Many successful hog men handle their permanent pastures by turning in only such numbers of hogs as will permit the grass to grow up and produce a hay crop. Among the best pasture plants are alfalfa, red clover, alsike clover, white clover, blue grass, bur clover, Bermuda grass, lespedeza, carpet grass, crab grass, and Dallas grass. The first five of these are used in the northern half of the United States and the others in the South. Blue grass and white clover

are generally grown together. Timothy is often grown with red clover. All of the grasses used in the North are also grown to some extent in the South. Of the permanent-pasture plants, alfalfa heads the list as forage for hogs. Where it can be grown no other permanent pasture is necessary.

Temporary pastures are made use of on a large number of hog farms as a supplement to permanent pastures, or to fill the gap where permanent pastures can not be grown. Every barnyard and small lot where hogs are kept should be plowed and seeded at least once a year, and as they are usually well fertilized they produce abundantly. The most common temporary pastures are rye, oats, rape, soy beans, and cowpeas. They are grown in practically all parts of the country.

HOG PRODUCTION ON THE PROJECTS

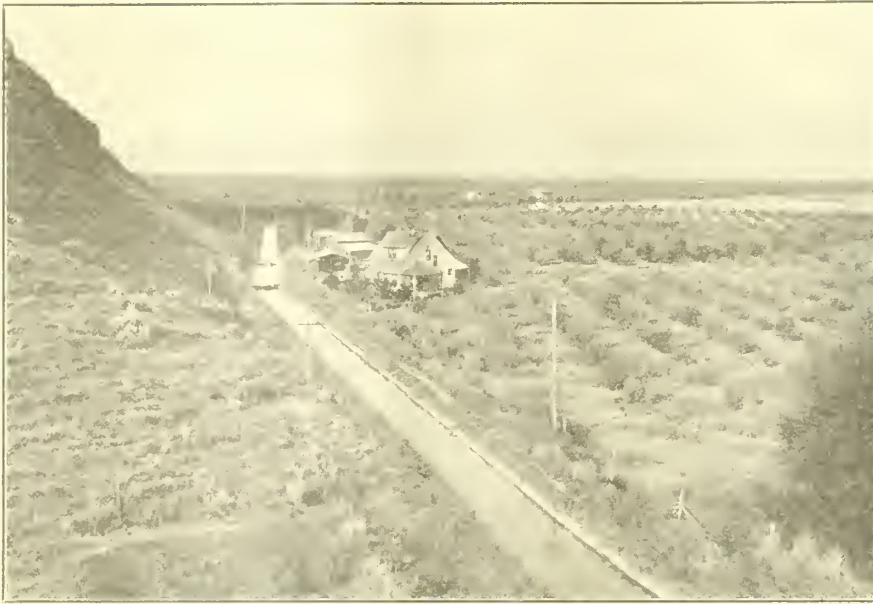
In utilizing farm wastes and in converting the concentrates raised on the farm into a marketable product, the hog is by far the most valuable animal. All regions of the United States may be considered suitable for raising hogs. The feeds used to grow and fatten hogs can be produced to a greater or less extent in practically every part of the country.

Feeds can be produced more abundantly in some localities than in others. Other factors, such as markets, climate, and quality of soil, also should be studied. It is best to start with but a few sows. As the herd increases in numbers a careful study of the farm should be made to determine what crops it will produce most successfully and how and to what extent hogs fit into the general plan for that particular farm.

It is always advisable to use purebred animals in founding a herd. Much time and money are lost by starting with low-grade sows and building up the quality of the herd by the use of purebred boars.

The 4,000 cars of Yakima apples in storage at the first of the year are equivalent to 3,024,000 boxes. The increased price of 35 cents a box, due to the rising market, swells the value of the 1924 crop by \$1,008,400, bringing the grand total value of apples to \$13,363,900.

Increased prices for Yakima agricultural products in storage at the first of the year, but recently moving steadily to market, indicate that at least \$1,250,000 will be added to the 1924 crop total if recent prices are maintained until the cleanup of the crop.



Vista from Round Top Hill, Okanogan project, Washington

EVERY FARM NEEDS A VEGETABLE GARDEN

Every farm should have a good vegetable garden. There is no piece of ground on the farm which can compare with the garden as a source of profitable returns for the labor expended. Half an acre of garden may easily produce \$150 worth of food. The garden is one place where the middleman may be eliminated,

because the crop goes direct from the field to the consumer's table. Many a family which has not made expenses during the last few years of depressed prices has lived on the fat of the land and without a store bill by means of a garden.

Our forefathers used to take tonics to tone them up in the spring. They felt the need of those vitamins which fresh vegetables supply, though they could not call them by name. These days we put away the medicines and eat asparagus, lettuce, radishes, and spinach.

Both good health and bank accounts are augmented by a garden.—*North Dakota Agricultural College Circular 58.*

AUSTRALIA GETS BRITISH SETTLERS

A recent press dispatch states that a definite agreement has been reached providing for the movement of 450,000 settlers from the United Kingdom to Australia, involving the expenditure of \$300,000,000 over a period of 10 years.

The Australian Government has agreed, it is stated, to raise immediately loans amounting to \$170,000,000 to be expended in rural development, clearing the land, and assisting settlers during the first 10 years.

The British Government proposes to assist 34,000 families, averaging 5 persons each, to sail for Australia and take up homesteads. Emigrants need not possess any capital whatever to take advantage of the scheme. Their passages will be paid and they will receive technical training, machinery, and periodic payments during the first five years.

IRRIGATION DISTRICTS INCREASE IN NUMBER

The extent of irrigated land under irrigation districts is increasing at a rapid rate, according to an article in a recent issue of the "Irrigation Review" by Samuel Fortier, of the United States Department of Agriculture. All of the 17 Western States now have irrigation district laws, based primarily upon the original Wright Act of California. These laws differ in many essential details; but they all provide for a type of organization that is a political subdivision of the State, that may issue bonds, and may levy assessments which become liens upon the lands of the district.

To January 1, 1922, there had been formed, in the United States, 598 such districts, of which number 80 per cent, or 478 districts, had been formed since 1908, or in the 13 years ended with 1921. In the two years 1919 and 1920, 156 districts were created, or more than one-fourth of the total number. These figures show that although the earliest district law (the Wright Act of California) was passed in 1887, by far the greatest activity has taken place in very recent years.

More than \$280,000,000 of bonds have been voted by these districts, of which nearly \$105,000,000 were outstanding January 1, 1922. These districts have covered nearly 16,000,000 acres of land, although of this amount some 4,500,000 acres are included in districts no longer active. It is estimated that in 1921 irrigation districts irrigated 2,857,400 acres of land.



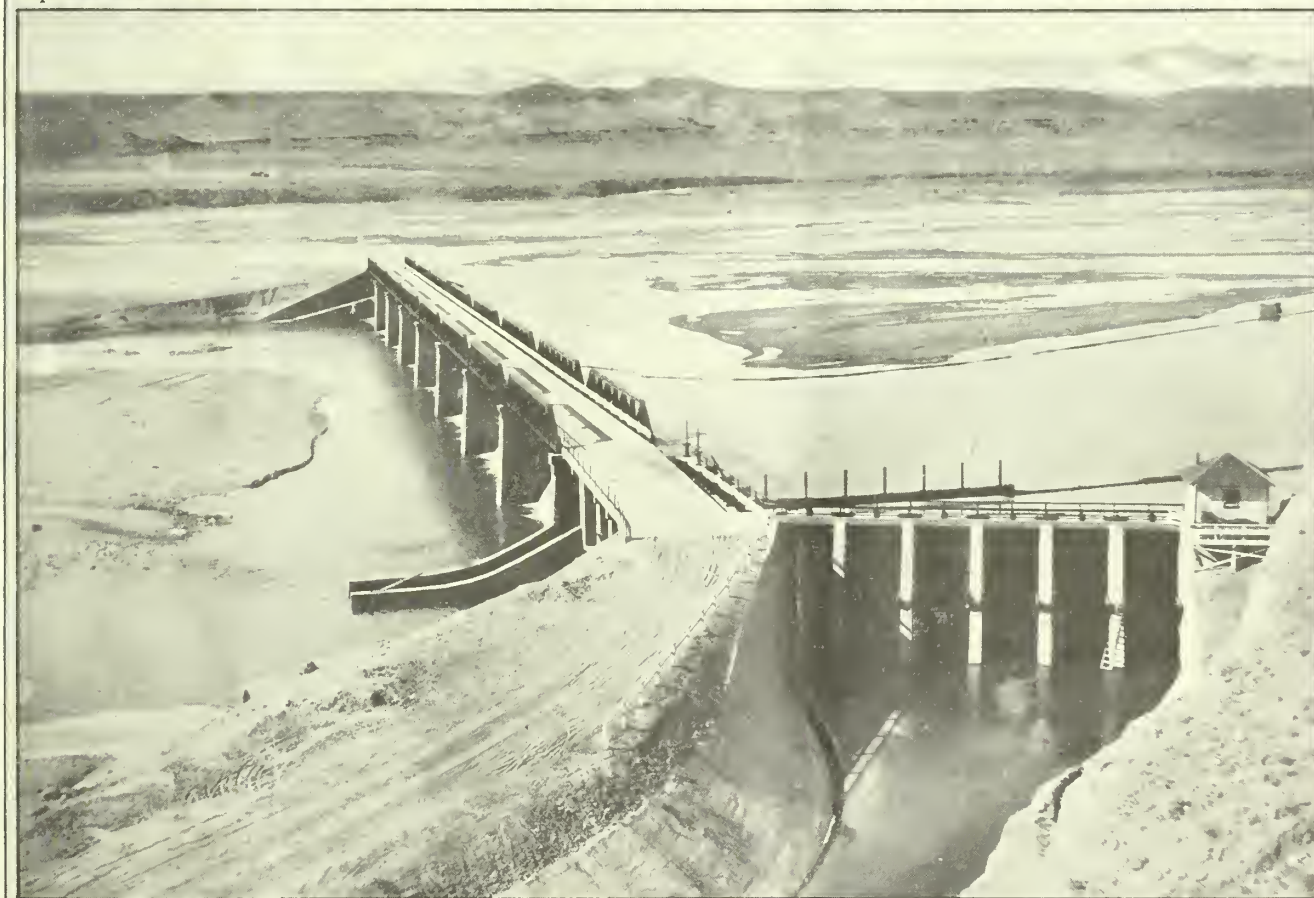
Field prepared for planting cauliflower on the Rio Grande project, New Mexico-Texas.

NEW RECLAMATION ERA

VOL. 16

JUNE, 1925

NO. 6



WIND RIVER DIVERSION DAM, RIVERTON PROJECT, WYO.

IT HAS BEEN FOUND THAT THERE HAVE BEEN REQUESTS FOR WHOLESAL RELIEF IN WHICH ENTIRE IRRIGATION DISTRICTS COMPOSED OF HUNDREDS OF FARMERS HAVE ASKED THAT THEIR CHARGES BE JOINTLY SUSPENDED. WE CAN NOT ACCEDE TO REQUESTS FOR BLANKET RELIEF. IN MANY OF THESE DISTRICTS THERE ARE FARMERS AND FARM OWNERS WHO RENT THEIR LAND AND OTHERS WHO ARE PROSPEROUS. IT WOULD BE MANIFESTLY UNJUST TO THEIR NEIGHBORS WHO CAN NOT PAY AND TO THE GOVERNMENT TO PERMIT THEM TO ESCAPE PAYING THE CHARGES DUE TO THE GOVERNMENT UNDER CONTRACT WHEN ABLE TO DO SO. THE GOVERNMENT MUST KEEP ITS CONTRACT WITH THE SETTLER AND HE IN TURN WITH THE GOVERNMENT.

THIS DOES NOT MEAN THAT RELIEF TO INDIVIDUAL FARMERS IS BEING DENIED. EVERY APPLICATION IS RECEIVING FAIR AND EQUITABLE CONSIDERATION. ANY SETTLER ON ANY PROJECT PRESENTING REASONABLE PROOF OF HIS INABILITY FINANCIALLY TO MEET HIS PAYMENTS IS BEING GRANTED AN EXTENSION OF TIME EXPECTING THAT HE WILL EVENTUALLY PAY HIS OBLIGATIONS TO THE GOVERNMENT AS PROVIDED BY CONGRESS.

*HUBERT WORK,
SECRETARY OF THE INTERIOR.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

JUNE, 1925

No. 6

BROADENING THE SCOPE OF FEDERAL RECLAMATION

*A discussion of new ideas and agencies for the settlement of unused agricultural land and the creation of new communities.—
The changes wrought and plans for future development*

By the Secretary of the Interior

ANY organized movement having for its purpose the improvement of farming conditions and the broadening of opportunities for farm ownership may be assured of support. I grew up on a farm and have retained an interest in good cultivation and good livestock. I realize how important it is to the stability of this Government that we create conditions which will hold and attract to the land people of equal intelligence, virtue, and interest in public affairs with those who live in the city.

That the conditions suggesting our investigations to determine the changes needed in reclamation policies in the arid region, and the incorporation in the bill providing for these changes a paragraph which authorizes the expenditure of \$100,000 in a study of the problems of reclamation and land settlement in areas outside of the arid domain may be more fully understood, the connection of the Interior Department with land settlement and the results of the first twenty-two years of the operation of the reclamation act should be known. With these as a background I may be able to present a conception of what changes are being wrought in the administration of the reclamation act by the bureau in charge, and what we hope to see achieved in the future.

The Department of the Interior, through the General Land Office, one of its bureaus, had jurisdiction over the greatest area of fertile land ever controlled by one civil polity. If Alaska is included in the United States, the total was, in round numbers, 1,800,000,000 acres, of which nearly 1,300,000,000 acres have been disposed of. Although the Interior Department has exercised control over the survey and disposal of these lands, the Government of which it is a part has never had a land-settlement policy. By that is meant that there has been no law and little attention given to the creation of organized and permanent communities and to fostering a kind of agriculture which would conserve

the fertility of the soil and its other resources.

Public land was first regarded as a resource from which funds could be obtained to replenish an empty treasury, and to do this land was sold in areas of any size and to whosoever wanted to purchase. What was done with this land or the conditions on which its owners and cultivators secured it were all matters outside the domain of public interest. The homestead act had in it a truer conception, but because it differed from the old speculative and revenue idea it was denounced as socialistic when introduced in Congress. It was, however, only suited to the fertile humid sections of the country, where agriculture could be established without organization and without the large preliminary outlay applying to the arid region, where settlement was necessarily preceded by the construction of irrigation works.

Other acts were makeshifts. There was a reluctance in Congress to enter into the problems of the individual settler. What most States desired was to get the land into private ownership so it could be taxed. There was no organization; there was no attempt to create a rural life suited to the conditions of the future and lay a permanent foundation on which our civilization might rest for generations. The wave of settlement which crosses the Alleghanies and swept on to the Pacific developed in people a migratory and speculative state of mind. No sooner was a house erected and fences built than the settler was eager to find a buyer so that he could go farther west and again share in the riches which he believed lay on the frontier. Valuable features of New England life which were incorporated in the settlement of that section were ignored or forgotten. There was no laying out of villages to provide for convenience of intercourse, no attempt made to choose adaptable people for the soil or to establish permanent agricultural practices.

Western life was virile and active and created a rampant individualism, but it was destructive of natural resources. It adopted methods of mining of the soil's fertility, it ignored the ultimate disastrous consequences of taking out of the soil without putting in, of land speculation, and inflation of farm prices. When finally the fertile public land was all gone and the door of opportunity opened by free land was closed there was nothing to take its place.

The first attempt at a new policy was the passage of the reclamation act in 1902. It had become evident that the building of irrigation works was beyond the means of the individual. It had not proven profitable by private enterprise, and so the aid of the Government was enlisted, but this act was defective in the limits of what it provided and what the public then regarded as necessary.

It was believed that if canals were built agriculture would follow; that settlers would flock to these lands, and in some undefined way carry out the costly and difficult task of clearing off the sagebrush, leveling the surface, providing the farm buildings, the implements and livestock, and doing all those things that go into the change of the sagebrush desert into the productive farm.

The generous terms of payment for a water right—twenty years without interest—made this domain a fruitful field for the land speculator, and the result was an early and disastrous inflation of prices on land in private ownership. More than two-thirds of the lands under the works heretofore built were in private ownership when they were inaugurated. The political pressure to have works built in the different States, regardless of cost or the productive value of water, determined the location of many, and as a result canals were built to water unfit land and where the cost of development was more than agriculture could stand.

(Continued on page 82)

PERNICIOUS PRACTICE OF NOT PAYING THE GOVERNMENT

Necessity of meeting other debts carrying a high rate of interest led settlers to disregard the claims of the Government which bore no interest

(Continued from page 81)

If this had been a real home-making institution as advertised, provision would have been made to enlighten settlers regarding these matters, but there was no selection of settlers. There was a ruling that the act did not permit the employment of people to give practical advice about how to prepare the land for cultivation or instruct the beginner to whom conditions were new as to what crops to plant and when to plant them. It was exclusively a construction agency, with the social and human requirements ignored in the act and neglected in its administration. The result was that some of the land was acquired by people who never were farmers and never expected to be, while the real farmer, who took his family into this new domain with his money and experience, had a faith and confidence in the Government that it would not have spent all the immense sums required to build these works unless it was to create conditions where he could make a living.

When he tried and failed his faith in our institutions was shattered, and a succession of such failures has eliminated blame from the individual and fastened it onto the system or conditions under which the uninformed and oversanguine individual undertook to create a home. Instead of being the open door to farm ownership many of these projects have been the scene of heartbreaking experiences to settlers and their families, leading to failure and the loss of their land and of their reliance on the Government to keep faith with them.

Settlers who entered on these projects under the impression that they were obtaining a farm practically free of cost found that it cost thousands of dollars to do the preparatory work. Lacking the capital themselves, there was no credit agency from which they could obtain money on terms suited to the undertaking. They could only borrow on short-time payments and at ruinous interest rates. Eight and twelve per cent is being paid on many of the projects for the money borrowed to level the land, build houses, and buy livestock.

As a result, two years ago, I found that the pernicious practice had grown up of not paying the Government for the service it rendered in providing water, because postponement of that payment did not increase the debt since it bore no interest, and there was on the projects a continued pressure to pay the local banker and

storekeeper and let the Government wait. What I confronted has been so well stated in a letter received by the Commissioner of Reclamation that I intend to quote three paragraphs. The writer is a professor in one of the State universities in the Middle West, but knows from practical experience the conditions which have confronted settlers.

"All of this sad state of affairs could have been wholly or largely avoided by making the operations of the Reclamation Service cover not only the investigation, design, and construction of projects from an engineering standpoint but from the humanitarian standpoint to investigate and decide whether, water once brought to the lands, it would pay the average individual to attempt to farm them.

"What waste of effort, money, toil, and the best years of many men's and women's lives might have been prevented on the _____ project and the _____ project, for example, if in the first place these projects had never been developed, but, granting that they would have been developed anyway for political reasons, who could measure now what it would have meant to those bitter, disillusioned, and bankrupt people if they had had then a certain amount of friendly counsel in selecting lands, in growing the right kind of crops, and in irrigating to prevent ruination of land, besides financial assistance in those first lean years in clearing the land, getting in the first crop, building houses and sheds, and generally helping the man to accustom himself to his new environment and occupation.

"I am opposed to paternalism in government and I believe that the future of this country depends upon freedom in the development of individual initiative, but if it is necessary to adopt a certain paternalistic policy in establishing successful settlements upon our irrigation projects (and I am sure that a certain measure of help is desirable), then I should say that we should go to any length of paternalism to prevent hereafter the melancholy spectacle of a whole community of Americans so thoroughly disheartened, disillusioned, and beaten as to be actually rebellious and ready to listen to any crazy agitator who would attack the good faith of our Government and advocate the repudiation of all debts owed to it."

When I became Secretary of the Interior it seemed that the first step was to ascertain the facts. I could not do this alone and so appointed a Fact Finding Commission, made up of men from different fields of activity, who could consider reclamation from the human and economic standpoint as well as in its construction and financial aspects. The report of that committee stressed the need in future development for more careful study of those conditions on which the welfare of the family

and the agricultural prosperity of the community would depend before any project was started. They stated that no project should hereafter be undertaken where the cost of the developed farm would be greater than its productive value. That even if the Government built the works the remaining expenditures involved in changing raw land into farms are too great for the capital of those likely to be willing to do this pioneering, and that in order to enable men of small means to succeed these things should be provided:

First, that there should be farm workers' homes for those who have no capital. This would give to people who worked for wages homes where much that they consumed could be grown. It would put the wife and children in a position of security and independence that is sorely needed in the rural life of America to-day and would add to their enjoyment of life in the open country. This is something we have ignored but which must be provided if community life is to continue to be an economic success.

For the farm owner there is need that he should have some capital, but equal need that he be able to secure advances in the form of loans to complete the development of the farm.

If there is to be no waste of time and effort, these people coming together from widely separated localities and entering on this enterprise in localities where conditions are strange and new should have intelligent advice and direction from those who understand local conditions. In this way an appalling waste of time and money and misdirected effort will be avoided.

The advantage of this detailed care in placing settlers on the farms and supervising their development is that it would bring into the service men of greater agricultural and economic experience; but if we were to create communities organized to provide for the needs of all classes of people who make up rural life and help them to cooperate in business and social affairs we would be solving a problem in which the local town and the whole country is interested. It would be undertaking a difficult task.

We are confronted to-day by an exodus from the country to the city of the ambitious and aspiring. More than half of our people already live in cities and

(Continued on page 83)

BROADENING SCOPE OF RECLAMATION

(Continued from page 82)

towns. We can not accomplish a back-to-the-farm movement, but we can foster a stay-on-the-farm atmosphere. We have the problem of how we are to retain the farm-born boy and girl on the land, which applies to the South and East as well as the West.

What we need is a combination of State and Federal policies and a recognition by both the States and the Nation that we have here a problem which requires the interest and effort of our ablest minds, a policy which is national in the truest sense.

There was secured through the Fact Finders' bill an appropriation of \$100,000 for investigations of the conditions necessary to settlement and reclamation in the unpeopled and thinly peopled areas outside the arid domain. It is my belief that if this appropriation were used to investigate how to drain a particular swamp or blast out or pull out the stumps on a particular area and then leave the settlement of the lands made available to the unplanned, unaided settlement methods of the past it would simply be adding a new area to be ex-

ploited by absentee speculative ownership, inviting waste of energy and money.

This money should be so expended as to secure a working knowledge of the conditions in sections of the country where land settlement is now recognized as a national problem. Such public opinion exists in North and South Carolina, where able men are already engrossed in this study and where commissions have been created to gather data at home and abroad. If our department can arrange to make a study of the locality best suited for the building up of new farm communities, of the methods which ought to be adopted as the basis for this development, so that we can build up a farm life full of opportunity and create homes which will be the permanent inheritance of the children and children's children of their founders, I shall regard the expenditure of this money as one of the most helpful and worthy endeavors of the Department of the Interior.

Proposals for investigations in any part of the country to determine how best to reclaim, people, and develop waste or neglected lands will therefore be welcomed.

FINANCE CORPORATIONS IN MILK RIVER VALLEY

An interesting development in connection with the sugar-beet industry on the Milk River project has been the organization of two finance corporations capitalized at about \$30,000 each. The Upper Milk River Valley Finance Corporation, with headquarters at Chinook, includes the territory between Lohman and Dodson; the Lower Milk River Valley Finance Corporation, with headquarters at Malta, includes the territory from Dodson to Nashua.

The purpose of these organizations is to finance labor for the sugar-beet growers up to \$12 an acre, also to finance the transportation of sugar-beet workers. An agreement has been made with all of the sugar-beet growers to deduct 50 cents a ton from each ton of sugar beets grown for the purpose of financing railroad transportation for the workers. This amount is, of course, advanced by the finance corporations and will be returned to them by the sugar company.

At first it seemed that it would be impossible to interest the growers in paying 50 cents a ton, but when they were shown that last year they paid out more than \$1.50 a ton in freight to ship their sugar beets to Billings, and that it would be necessary to continue this for another year or two unless they were willing to cooperate in the financing of transportation for sugar-beet workers, they very soon consented to contribute the 50 cents per ton and get the factory right away.

The sugar company would not undertake to supply the labor for the reason that it was necessary to import about 90 per cent of the hand labor required for this year's crop, and they considered this too much of a responsibility together with the erection of a new factory. It is working out very well, however, and the most fortunate thing that they ever did was to organize these finance corporations. The stock is subscribed to by about all the business men, banks, and individuals, so that if there is any loss it will be very light to each one.

It would have been utterly impossible to have raised the funds to handle the sugar-beet laborers had they not hit upon this finance corporation plan.



Strawberries add many a dollar to the farmer's income

The Danish farmer makes agriculture a business, and it is a business that is organized into hundreds of cooperative associations for buying fertilizers and foodstuffs, for selling products, for making butter and cheese, and for breeding cattle and horses.

TENTATIVE PLAN TO OBTAIN SETTLERS ON PROJECTS

The following tentative plan to fill up the gaps on available farm units on existing irrigation projects of the Bureau of Reclamation has been prepared with a view to eliciting general discussion of this problem

A CONFERENCE held at Chicago in March, 1925, by Secretary Work and Commissioner Mead with representatives of several railroads (see April, 1925, issue of NEW RECLAMATION ERA) disclosed that to settle adequately existing reclamation projects and the new projects recently authorized by Congress will require approximately 17,000 additional settlers. The new projects present special problems and will not be considered in this discussion. The existing projects scattered throughout fifteen of the seventeen western States all require additional settlers. Some of them are obtaining settlers in considerable numbers; on others settlement is practically at a standstill.

The Rio Grande project in New Mexico and Texas obtained about 600 settlers last year through the activities of the Gateway Club of El Paso, Tex., the Chamber of Commerce of Las Cruces, N. Mex., and the Santa Fe Railroad. These organizations have gotten out attractive literature and are advertising in 512 periodicals and newspapers circulating generally throughout the agricultural sections of the United States and Canada. The results obtained are gratifying, but many communities could not afford such an ambitious program.

ORGANIZATION ESSENTIAL

It is believed that an organization can be perfected and a plan outlined which

will function satisfactorily on each project. The organization and plan must be the result of complete cooperation of all local interests in order that the population of both towns and country will be entirely and wholeheartedly behind it. To this must be added options or contracts for exclusive sale of lands and listings of farms for sale which offer a variety of opportunities to intending settlers. There must be no question in regard to the opportunity offered. Each farm must be worth the price asked and suitable for settlement. There is no place for the speculator in this program. With these two things accomplished full cooperation of the railroads, sugar-beet companies, State colonization agencies, and the Bureau of Reclamation can be anticipated.

A GENERAL COMMITTEE

In order to bring about the organization of the community the general program of putting a settlement campaign into effect should be in the hands of a General Committee to be composed of the secretary of the Chamber of Commerce, the county agent, the president of the Farm Bureau, the project superintendent, one or two interested bankers, a newspaper editor, a representative of the State grange, a representative of the realtors, an enterprising merchant, a representative of the sugar factory or other industry related to farming and two or more farmers. These men should be chosen carefully for their

interest and their knowledge of the problems of farming and their desire to build up the community. They should be known for their integrity, business sense, and public spirit.

COMMUNITY SPIRIT NEEDED

The General Committee should hold meetings throughout the community and explain the plan to be followed. The General Committee should seek to build up the friendly interest and obtain the cooperation of farmers and business men in the plan. To be successful the community must be solidly behind the program. All must realize that if new settlers are to succeed they must be made welcome, must be given an opportunity, and must be encouraged by their neighbors and their newly formed business connections. Nothing is more valuable in a community building program. Without this spirit of confidence, failure is certain. The General Committee would also have charge of raising the necessary funds to pay for necessary printing and moderate advertising expenses.

FARMS MUST BE APPRAISED

A form should be sent to all owners of land on the project who desire to sell, particularly to the owners of land who do not reside on their farms but who desire to sell their properties, upon which form the owner shall describe the lands he has for sale, with a list of the improvements,



Truck gardening on the Boise project, Idaho

and state the purchase price desired and the terms of sale. He should also state whether he would be willing to give an option to the General Committee running for a period of one or two years.

An appraisal committee composed of the project superintendent, the county agent, and one of the best farmers of the project, none of whom should have any land to sell, should go over these options and listings and carefully appraise the properties on the ground. They should examine the soil and determine its productive value, carefully list and appraise the improvements, determine the area leveled and graded and the kind of agriculture most likely to succeed on each property, and other pertinent facts that should be made known to the intending settler. Thus the appraisal committee will arrive at an unbiased appraisal of the true worth of each property.

If the owner's selling price is in excess of this committee's appraisal, he should be encouraged to reduce it to the committee's valuation. If the owner is unwilling to do this, his farm should not be offered for sale by the General Committee. The value of the property is not the only important item; to the new purchaser the terms of purchase are quite as important. The General Committee should, therefore, be sure that the terms of purchase are suitable to meet the intending settler's present means and the earning power of himself and his family after he has purchased the farm. If the lands are heavily mortgaged, care should be exercised to see that the mortgagee will transfer the mortgage to the new purchaser under repayment terms and interest rates which the agriculture of the region can bear. It

can readily be seen that it would be a calamity to sell a farm to a purchaser attached to which is a mortgage with a short repayment term and bearing interest at 8 or 10 per cent.

BOOKLETS TO BE ISSUED

From the options obtained approved farms should be described in detail in a small booklet. These descriptions should include the area of the farm, its irrigable acreage, the price per acre, and the terms of purchase, the kind and character of house and out buildings, the kind of domestic water supply, the crops that can be successfully grown, stating how many acres are leveled and under ditch, the taxes and irrigation charges, the distance of the land from schools, shipping points, towns, and other essential facts. The booklet should recite that the plan is in charge of a General Committee, the personnel of which represents the highest types of men, interested only in building up the community by safe and honest methods. It should also be stated that the lands have been appraised by a disinterested committee of trained and experienced people who have nothing themselves to sell.

These farms should be tied up with an option of purchase running to the General Committee for a period of from one to two years in order that the organization can deliver the farm to the new purchaser, who, in many cases, will have traveled a considerable distance and will have spent a considerable sum of money to inspect the properties. Some owners will not care to tie up their lands by such an option, but would be willing to list

them with the General Committee. Such farms would not be advertised in the booklet, but could be offered to settlers, provided the General Committee approved the selling price, the terms of sale, and other conditions.

The advantage of a booklet as described, offering perhaps 50 farms carefully selected, is that each one is a definite thing. It would be a catalogue of definite opportunities. Such a booklet has a great deal more value than mere general descriptive matter. These booklets might be given free distribution by the Bureau of Reclamation, by the interested railroads, and by other industries interested in the locality. "The 50 opportunities" could be advertised in a few carefully selected newspapers and periodicals circulating throughout the section of the country from which it was expected to draw settlers.

COOPERATION WITH REAL ESTATE AGENTS

The options and listings could be made available at the various real estate offices on the project under an agreement whereby the realtor, if sale was made would turn in 25 or 30 per cent, or an amount to be agreed upon, of his commission to the General Committee for the purpose of partly defraying printing, advertising, and other expenses. It must be understood, however, that the new settlers should receive some consideration by the appraisal committee whose duty it would also be to interview them and pass on their fitness for the undertaking. In other words, the settlers should be

(Continued on page 86)



Blooded dairy stock on the Boise project, Idaho

NEW SETTLERS NEED GUIDANCE, ADVICE AND CREDIT

New settlers are in particular need of financial and agricultural program in order to avoid costly mistakes. Various forms of credit may be made available

(Continued from page 85)

selected, and while the appraisal committee could not be in session all the time the project superintendent could, in most cases, perform this duty for the committee. No settler should be encouraged to buy who has not a reasonable chance of succeeding. In addition to the advertising the General Committee should canvass the project and encourage each farmer and business man to send the booklets to some of his friends or acquaintances in other sections of the country. If farms are properly appraised, farmers and business men will be glad to do this.

EFFECTIVE WORK NEEDED

The success of such a plan will depend entirely upon those interested in carrying it into effect. It will not run itself. It will be just as effective in building up the community as the community is in putting it into effect. The program, as provided, safeguards the settler from speculative prices, it offers to him an opportunity in keeping with his limited means, it puts into effect a cheap form of effective advertising, and will, if carefully administered, bring results.

NEW SETTLERS SHOULD BE GUIDED

No plan of settlement would be complete without some thought given to the guidance and advice new settlers should receive after they purchase their farms. Every farmer must have a financial and agricultural program. New settlers are in particular need of it. If the new settler is not helped in this respect he will make costly mistakes. He should be advised on the kind of crops to be planted, where he can buy satisfactory seed, and the time and methods of planting. He should also be advised where he can buy tubercular-free animals of high production, the kind of farm buildings needed, and the cheapest and most satisfactory material required for their construction. A satisfactory crop rotation should be worked out. There is nothing so valuable as these "tips" to the newcomer when given by some one who knows and whose judgment is sound. If the number of settlers obtained is small no doubt some attention could be given to this work by the project superintendent, the county agent, and perhaps a good farmer in the vicinity. If the new settlers come in considerable numbers these agencies could not give these things adequate attention, and sooner or later some person of outstanding ability would have to give full time to the work. The plan would no

doubt work out much better if from the start a good man could give full time to the work under the guidance of the General Committee. There is nothing of more value in a successful settlement program than to assist the new settler in becoming thoroughly established.

OBTAINING SUITABLE CREDIT

On some projects the Federal farm loan system of credits is in operation. Generally on such projects short-time credit is adequate and may be secured for 7 and 8 per cent. On other projects these are not the conditions. The farm loan system is not functioning and mortgages bear 8 to 10 per cent, with ruinous commissions for renewals. On such projects short-time credit bears 10 per cent interest. Settlers are needed most where credit conditions are the worst.

OPTIMISTIC OUTLOOK

Agriculture has entered the new crop season with good prospects for a more prosperous year. The pressure of hard times, though still in force, has relaxed somewhat, and farmers are in a better frame of mind than last spring, according to the May 1 agricultural review of the Department of Agriculture.

Three members of the General Committee should study the peculiar credit needs of the community, and especially of the new settler, and make plans for adequately meeting them. Credit facilities should be thoroughly canvassed by this committee and the information arranged for ready reference so as to be available to the prospective settler and to the present settler as well. The first effort should be to convert the high interest-bearing real estate loans into amortized loans with a lower rate of interest. One project, through its bankers and other interested citizens, has already made progress in this respect.

A form of credit not yet made general use of on the projects may be obtained through the Federal intermediate credit banks authorized by the act of Congress approved March 4, 1923 (42 Stat. 1454). Intermediate credit is neither short nor long, but, as the name implies, between the two; that is to say, from six months to three years. Such credit is particularly suited for the raising, fattening, and marketing of livestock. If an agri-

cultural credit corporation or an incorporated livestock loan company is organized with a paid-up capital of \$25,000 it may rediscount its loans with the intermediate credit bank not to exceed ten times its paid-up capital and surplus. In actual practice, however, the expansion of credit is not so great. Much depends on the integrity of the official personnel and financial standing of the corporation. Other financial institutions are making use of this form of credit. It is entirely possible to make full use of this form of credit on many of the projects.

The new settler should have money enough to make his initial payment, buy equipment, seeds, and pay his first year's operating expenses. He rarely will have enough capital to purchase livestock when his feed situation demands it. If he purchases dairy cattle and is obligated to pay 10 per cent interest on the loan and must turn over one-half of his cream check to the mortgagee some of his other bills will go unpaid. Settlers can not pay the balance owing on their farms, taxes, water charges, and make needed improvements and part with one-half of their cream checks at the same time. Agriculture never was, and isn't now, profitable enough to do this. Dairy loans should be divided into 36 monthly payments, with interest at 6 per cent. This kind of credit would build up good herds of cattle and flocks of sheep, and attention could be given to their breeding and health, because it would be a permanent industry.

Bankers with whom this situation has been discussed are anxious that their clients have suitable long and intermediate credit. They can be relied upon to help. The special committee having this problem to solve should be headed by a progressive banker.

The Division of Reclamation Economics of the Bureau of Reclamation will be glad to assist any of the projects in formulating plan of settlement and help work out ways and means of putting it into effect. Some modification will, no doubt, be necessary to meet local conditions, but it is believed the general principles laid down are sound. Constructive criticism and helpful suggestions from the readers of the NEW RECLAMATION ERA are earnestly invited.

Steady employment and better living conditions for farm laborers and their families are necessary to attract capable employees to farm work.

WHAT IS THE VALUE OF A SETTLER TO THE RAILWAYS?

An interesting discussion by a number of representatives of western railroads serving the projects, based on the estimate of \$746.33 as the gross value, made by the Canadian Pacific Railway Co.

IN a recent report of the Soldier Settlement Board of Canada the statement was made that the Canadian Pacific Railway estimates that every producing settler is worth \$734 to the railways alone each year. The railway was asked to analyze this figure, and this was furnished as follows:

The sum of \$746.33 represents the gross value of a settler to the railroads, and is arrived at in the following manner. During the five-year period 1916-1920 the gross income of the railways in the Prairie Provinces was \$823,970,326. Only four items are taken into consideration in compiling this figure, namely, agriculture (horses, cattle, sheep, pigs, wheat, oats, barley, and flax), coal, and in and out going passenger revenue. On the basis of 219,105 farmers in the area—1916 figures—and the division of one total by the other, we arrive at a figure of \$746.33, the settler's gross value to the railway. This does not take into account the railroad's cost or show the railroad's profit, the \$746.33 just showing the total earnings per farmer. If we take the gross from the net income for the years 1916 to 1920, inclusive, we find the percentage of net income 23.8 per cent—\$177.62 per annum on each farmer.

Representatives of several of the western railroads serving the projects of the bureau were requested to comment on this estimate, and a number of interesting replies were received.

One of these representatives points out that on the basis of \$734 a year the capitalized value of such a settler to the railroad would be \$12,400, which is a much higher average figure than he thinks reasonable. He believes that it is a safe assumption that any family that sticks in a country is worth \$1,000 to the railway company as a capitalized value, and that some families are worth more than \$10,000. He concludes that to assume that every well located and established and prosperous family has a capitalized value of \$5,000 to the company along whose lines it becomes established would be to assume that the railroad would make a profit from this family of \$300 a year, which is less than half the figure given by the Canadian Pacific. However, he is inclined to think it is a reasonably fair average.

Another agricultural representative of a western railroad discusses the difference in types of settlers, and assumes that from a farmer located on the Canadian prairies producing a large acreage of wheat or similar crops the value to the railway might be very much greater than from an ex-soldier located on cut-over land in northern Minnesota; that the amount of products shipped by any new

settler, whether a soldier or otherwise, if located on cut-over land, is very small in comparison to a homeseeker located, for example, on the prairie lands of North Dakota or western Minnesota; that an experienced farmer moving from Illinois, Indiana or any other State to any of the northwest States, usually has from one to two cars of emigrant movables, and in the years past has had some capital to start with, so that during the first year he is likely to have anywhere from 160 to 240 acres in crops

with a corresponding value to the railway, whereas if he is a man of very limited means and is not equipped with livestock or farm machinery it will probably require a number of years for him to get on his feet and become a producer of importance. He concludes, however, that the Canadian Pacific Railway has not over-estimated the importance of the producing settler, and that the gross returns to the railway might amount to \$750 to \$1,000 for a good, well-equipped farmer on grain lands.



Young orchards of oranges, grapefruit, and lemons, Yuma Mesa, Ariz.

R. F. WALTER NOW CHIEF ENGINEER

Raymond F. Walter has been appointed Chief Engineer of the Bureau of Reclamation, effective May 1.

Mr. Walter has been serving as Acting Chief Engineer of the bureau since the first of November, 1924, following the resignation of former Chief Engineer Weymouth. He has served in the bureau since 1903, and has been advanced from engineer to supervising engineer, assistant chief of construction, and assistant chief engineer. He was born in Chicago, and is a graduate of the Colorado Agricultural College, later taking a post graduate course in civil engineering.

Mr. Walter's headquarters are Denver, Colo.

Another representative of a western railroad figures that the average settler, say in North Dakota, is good for \$250 worth of new business, and in Montana and further west he is worth \$350; another that each producing settler is worth approximately \$500 to the railroad each year; and still another that the man who is really making a farm success should be worth to the carrier line anywhere from \$600 to \$900 per year, according to the scale on which he is conducting his farm business; and that in the long run the value of a settler to a carrier line depends largely upon his ability to get right down to business and hustle. On the basis of a capitalized value of \$5,000 and a gross revenue of \$300 a year, the gross value each year to the western railroads of the 30,000 families on the projects of the Bureau of Reclamation would amount to \$9,000,000.

PROBLEMS OF FEDERAL RECLAMATION

If Government development is to continue, more attention must be given to its economic and human requirements—Project costs in the future will be much greater than in the past

By the Commissioner of the Bureau of Reclamation

THE whole country is interested in the continuation and success of the national reclamation policy. On this depends the growth in population and wealth of some of the arid States.

Conditions created by the Great War have put an end to important irrigation development by private capital. This result has come through increase in construction cost and lessened profits of farming.

The money for building Federal irrigation works and to carry on their operation comes from the proceeds of the sale of public land, the repayment of the cost of these works by settlers, and a part of the income from oil and timber lands. About \$200,000,000 has been expended. It would take \$110,000,000 more to complete the old projects and build the new ones for which appropriations have been made.

IF GOVERNMENT DEVELOPMENT IS TO CONTINUE, MORE ATTENTION MUST BE GIVEN TO ITS ECONOMIC AND HUMAN REQUIREMENTS

On some projects all the money owing the Government has been paid; on others the revenue derived has not even covered operating expenses. Last year one of the good projects paid 7 per cent of what it cost to operate it. Another paid only 15 per cent. The original idea of a revolving fund which would return in twenty years all the money invested so that it could be used over again has not worked out. One project that owed \$440,000 only paid \$25,000, or 6 per cent; another project that owed \$11,000 paid only \$69; another that owed \$112,000 paid \$6,000. Financial results of this kind would, if universal, soon bring reclamation to an untimely end through emptying the reclamation treasury.

While some projects pay little or nothing, others pay nearly all. Before we approve of entering on larger development, which many desire, we should know what has brought about the present situation and put our house in order to meet new obligations. This has been the task of the Secretary for the past two years.

In order to understand the situation he created the Fact Finding Commission to ascertain why there were so many complaints, why there was such irregularity in payments, and what changes ought to be made. He followed the

report of this commission with successful endeavors to secure legislation by Congress. He followed these preliminary steps by appointing a Board of Survey and Adjustments to visit projects where conditions were most unsatisfactory, and, acting on his motto that one look is better than a thousand words, he has made a 10,000-mile journey to visit a part of the Federal reclamation projects, and is about to start on another journey to visit some of the others.

THE RECOMMENDATIONS OF THE FACT FINDING COMMISSION

The experience of the last 20 years, the conclusions of the fact finding commission, and what the Secretary has seen on this visit seem to make clear that the reclamation law centered too much attention on construction and gave too little attention to the agricultural and economic conditions. These are the things which measure earning power and ability of settlers to pay. There was a confident but unthinking belief that the building of an irrigation canal would, of itself, create irrigated agriculture; that once this was done settlers would flock in, and regardless of whether they knew anything about irrigation farming, whether they had any money, they could, if given a piece of land, somehow dig in and succeed. Although irrigation under canals where water rights are costly requires intense culture and the growing of high-priced crops to repay the money, there was nothing in the law that would authorize the selection of settlers, nothing to inform them of what changing a piece of raw land into a farm would cost. The charges imposed on alkali flats and areas of infertile shale were exactly the same as on the richest river silt on the same project.

LOSSES IN IRRIGATION DEVELOPMENT ARE INEVITABLE

Reclamation development has also suffered from the declaration in the reclamation act that all the money expended should be returned to the fund. Many projects were begun that required years to complete. All the earlier estimates were made when construction costs were low and usually the first part of the land settled came in under a low construction cost; when, years later, additional lands were irrigated, higher prices made costs greater, and the next unit thrown open was at a higher cost than the original

estimate and higher than the settlers on the settled part of the project were paying. With every increase in cost there had to be a boost in prices of water right so as to avoid losses. This has resulted in great inequality of burdens on the same project. Discontent on the part of settlers carrying the larger costs was inevitable, and it has created a difficult and embarrassing situation for those in charge.

THE EVILS OF LAND SPECULATION

One reason why settlers on projects that should be prosperous are not meeting their payments to the Government is the fact that they owe private debts bearing a high rate of interest that take all the money they can spare from the operation of their farms and supporting their families. Not only is it to their interest to pay the debt that bears interest and postpone their debt that bears no interest, but great pressure is exerted on them to keep their money at home—let the Government wait. Many of these settlers' debts are due to a speculative inflation of land prices which occurred on nearly all of these projects in the early stages of development. The generous terms of payment for water rights by the Government made this a fruitful field for the land salesman who would point out that all one had to pay on the water right was a low rate of interest for 20 years and then his payments would end, and it was often whispered to the settlers that if they stood together they could succeed in having payments postponed or written off entirely. When the Secretary asked an officer of a settlers' organization why they were not doing more to meet their payments the answer was that until the Government collected its debt from France it ought not to ask settlers to pay. This does not mean that many settlers on these projects are not going through a distressing experience. They have suffered as farmers everywhere have suffered, but their trouble to-day is not so much meeting project costs as the high interest rates and the payment of principal on their private debts.

The remedy for this is not to make reclamation a credit agency but to try and work out some system for the refunding of their debts which bear 8 and 12 per cent interest. Many of them now are overdue and should be converted into long-time amortized loans bearing low

interest rates. Financial and economic relief should come from some other sources than postponement of payment of expenses for operating canals.

The Secretary has taken a decided stand in this matter. One of the projects that has never paid operating expenses is to be sold for what it will bring. Where it is known that water users are able to pay they are being pressed to pay, in justice to struggling, deserving settlers who have paid; and where there is a refusal to pay suits are being brought to collect. An end has been brought to the demoralizing practice of issuing blanket moratoriums which only pile up the debt to be paid in the future, which lets the well-to-do and prosperous escape their obligations in order that relief may be extended to those who ought to have it. Hereafter, if the view of the Secretary prevails, the relief extended will be individual and will be confined to those who can show that they have made every effort to meet their obligations to the Government.

ADJUSTMENT OF PROJECT COSTS

On some projects there must be an adjustment of payments and the writing off of part of the cost. It was the conclusion of the Fact Finding Commission that on some of the projects money has been spent which can not be recovered and that this loss should be admitted and the records revised to show the exact situation. This does not mean that the project costs on the good lands will be reduced. The Frannie division of the Shoshone project or the east side of the Uncompahgre project are illustrations of the need for adjustment. Here canals have been built to cover large areas of unfertile land. On the Shoshone project 200 settlers have abandoned these farms. On the Uncompahgre project there are thousands of acres that are not being cultivated and never will be. The cost of the canals to cover these areas should be written off.

PROJECT COSTS IN THE FUTURE WILL BE MUCH GREATER THAN IN THE PAST

It is certain that the increased cost of everything will be reflected in the future cost of irrigation works. The estimates for water rights for four new projects included in last year's appropriation vary from \$125 to \$160 an acre. That is far higher than the actual costs on any of the old projects. Hereafter the land will be classified and the cost of water rights, instead of being uniform, will vary on different classes of land, because earning power varies. On the project where the average cost is \$160 the cost of the water

right for the best land may be between \$175 and \$200.

In order that Congress might understand what would likely happen if these projects were built, four economic boards were created to study conditions and make a report as to whether they were feasible. These boards reported that, in addition to the cost of the water right, the settlers who took up farms would have to expend from \$100 to \$125 an acre for clearing the brush, leveling the land, constructing fences and farm buildings, providing the minimum of livestock and equipment, and paying expenses until crops could be grown. In other words, the settlers would have to spend from \$5,000 to \$10,000 in order to make these farms going concerns. All of these investigators recommended that there should be on every

project some one who had practical knowledge of conditions, who would act as an advisor to the settlers, telling them how and where to carry on development, what crops to grow, and where to find markets. That settlers should be required to have some capital and some experience.

COOPERATION BETWEEN THE STATE AND FEDERAL GOVERNMENT

It was recommended that there should be some credit agency from which advances could be made to pay a part of the development cost. A difference of opinion arose as to how this should be accomplished. One view was that the money for these agricultural needs should come out of the reclamation fund, as



Thirty acres of Irish cobbles, King Hill project, Idaho

LAND CLASSIFICATION SHOWS GOOD PROGRESS

The local committees, working in conjunction with the Board of Survey and Adjustments, have been making excellent progress in the classification of project lands under the provisions of subsection K of the fact finders act of December 5, 1924.

During the month of April classification was completed on the Yakima, Belle Fourche, Grand Valley, Huntley, Lower Yellowstone, and Sun River projects, and was 75 per cent completed on the Klamath and Milk River projects, and 50 per cent on the Newlands project.

does the money to build canals and reservoirs. Another view was that the time had come when the State should be called upon to make some investment and effort in a development which meant more to it than to the Nation. The State view prevailed, and on the four projects referred to there is a requirement in the appropriation that the State must agree in a contract with the Secretary to take charge of settlement, to lay out and plan the development of the farms, to furnish practical advice and direction, and advance money to complete the improvement and equipment of farms. The indications are that they will comply with these conditions and that an era of cooperative development is before us.

PROPER BUILDING ARRANGEMENTS SAVE TIME AND LABOR

Actual observation has shown that proper arrangement of farm buildings in many instances saves one mile of walking every day, or 365 miles per year. In 30 years this would mean more than 10,000 miles

CONSIDERABLE study has been given recently by the department of agricultural engineering of the University of Nebraska to the arrangement of farm buildings with a view to the saving of labor, material, and the time of the farmer. Some of these studies have been incorporated in a leaflet, which is quoted below in the belief that the suggestions will prove helpful to the water users on the irrigation projects of the bureau.

The accompanying illustration represents a nearly ideal arrangement for a 160-acre farm in the prairie States. This plan was worked out for one particular farm and has been tried out on farms in several counties of Nebraska. Many points have been given consideration in planning this farmstead to make it practical and at the same time comfortable and pleasant.

The barns and yards are located east of the house so that unpleasant odors are carried away by the wind which is south and southwest in summer and north and northwest in winter. The house is on high, well-drained land, which insures a good view and prevents barnyard drainage from reaching it.

All buildings are windbreaks to adjoining yards, nearly all fences serving two lots. The yards are adjacent to the pastures and the garden close to the house. The scales are so situated as to be handy for weighing grain and stock. It is possible to drive to nearly all of the buildings without opening gates.

Each building in this arrangement is planned so as to house sufficient feed for stock in adjoining lots. Thus, unnecessary walking is eliminated, and the man who does the chores has only to follow a

general path around the group of buildings, as shown by the dotted line in the illustration.

When a man starts doing chores in the morning he goes from the house to the barn, where he tends the horses, colts, cows, and calves, separates the milk, and feeds the calves. He then takes the remaining skim milk to the pigs at the farrowing pens, and goes to the combined crib and granary to feed the fattening hogs and fat cattle. In returning, he passes the hay shed and feeds the stock cattle and then the poultry. He steps into the milk room at the barn, gets his cream, returns to the house, and the chores are done. He has walked only 750 feet. When two men are doing chores one goes to the barn and one takes care of the outside stock.

Suppose it is evening and the farmer is coming through the lower gate by the hay shed. His course to the barn leads past nearly all of the buildings, and most of the chores can be done while the team is reaching the tank, drinking, and going to the barn. When the horses and cows are attended to the chores are done.

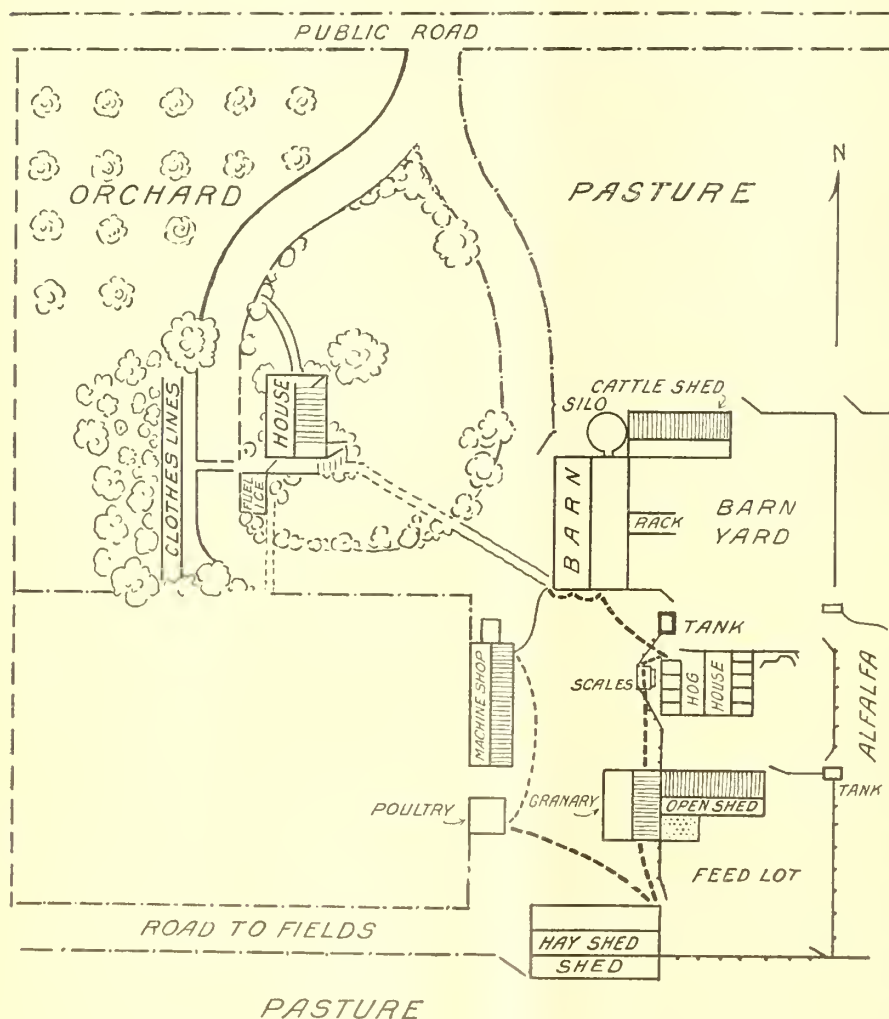
Factory managers save thousands of dollars each year by devising methods of saving labor, but very little study has been giving to the arrangement of farm buildings so that farm operations can be made efficient. Yet one-fifth of the value of all farm properties is invested in buildings. Actual observation has shown that proper arrangement of farm buildings in many instances saves 1 mile of walking every day, or 365 miles per year. In 30 years this would mean over 10,000 miles.

GENERAL RULES

Methods of farming and topographical and geographical locations may vary so much that it is impossible to furnish a standard plan that can be adopted on many farms. It is possible, however, to give an outline of laws governing good arrangement, together with a farmstead plan which approaches the ideal and furnishes suggestions which will aid in arranging each individual farmstead.

Some rules in arranging the farmstead follow:

1. It is possible to heat buildings artificially but not to cool them in that manner. Hence, take advantage of natural elements to make the buildings comfortable in summer as well as in winter.



2. Low, hemmed-in alleys are damp and hot in summer and very little, if any, warmer in winter than high and slightly places.

3. The land on which the buildings are located does not produce crops. For this reason, when choosing between two locations, choose the one which has the poorer soil.

4. A sandy soil washes slowly and drains well.

5. The winter winds are from the north and the summer breezes are from the south. Take advantage of this and let the buildings be windbreaks to the yards, but keep them open to the south. Odors will not reach the house if the barn and yards are placed toward the east.

6. Buildings situated in the sun but with breezes blowing through them in the summer are cooler and more comfortable than those in the shade with no breezes. Hence, a barn with a central alley running north and south is cool, even in very hot weather.

7. When buildings are protected from the north winds with trees or a hill, but are open to the south they are warmer in winter and cooler in summer than those which are closed to the south breezes and exposed to the north. A southeast hillside is a very desirable location.

8. A southeast slope is best; a south slope ranks second; southwest, third; east, fourth; and west, fifth. Northeast, north, and northwest slopes are to be avoided if possible. A level site, while poorly drained, is to be preferred to the last-named three. South slopes are good for feed yards.

9. Good fences always pay, and each barnyard fence should serve two lots if possible.

10. Select a good view for the house. Remember that the women spend most of their time there. A good view of the surrounding country does much to relieve monotony.

11. If buildings can be placed close to the highway such a location is to be preferred to others. However, the house should not be placed too close to a main automobile highway, as dust is very unpleasant.

12. Do not place too much stress on having the buildings close to the water supply, as it is generally cheaper to pump the water through pipes than to put in several extra hours daily on account of poorly located buildings. Tanks should be so situated as to serve two lots if possible.

13. An east front is most desirable for a house, south next, west third, and north last.

14. Do not have the barn traffic pass the house.

A COOPERATIVE DAIRY ASSOCIATION

J. W. TAYLOR, president and manager of the Elephant Butte Irrigation District of New Mexico, Rio Grande project, furnishes the following interesting statement concerning the operations of the Cooperative Dairy Association on the project:

Cooperative selling of dairy products on the Rio Grande project started in 1916 as a small corporation financed by farmers and had a capital of \$2,500. This organization has grown rapidly until its present stage of development shows a capitalization of \$100,000. Until two years ago business was handled by a corporation the stock of which was subscribed voluntarily by the dairymen interested. At that time it was realized that it should be made more strictly cooperative, and the business was reorganized under the cooperative marketing law of the State of Texas. The old corporation was still maintained, the Cooperative delivering its milk under a cross contract to the corporation, guaranteeing to the latter all the costs of processing and selling milk and milk products, dividends on its stock amounting to 10 per cent. Any revenues above these costs and dividends are distributed to the dairymen and are taken care of for the most part in an estimated price paid monthly on the milk. This price at present is \$3.50 per hundred for 4 per cent milk, with 5 cents additional or deducted for every one-tenth of 1 per cent of butterfat that the milk varies from the 4 per cent test.

Any proceeds accumulated above the amount paid on the estimated value of milk to the shippers are distributed annually in a twenty-fifth milk check. Payments are made to shippers for milk twice a month. The corporation is financed by the members of the Cooperative who have pledged themselves to a deduction from their milk checks of 5 per cents of the amount due them in each payment. This 5 per cent, instead of being paid in cash, is paid in stock in the corporation, and in this manner the rapid expansion of the plant has been provided for.

There are at present 199 dairymen in this Cooperative. The plant in El Paso employs approximately 90 employees. It is the best equipped milk and ice-cream

plant in the Southwest, and is fully provided with facilities for both wholesale and retail delivery.

During 1924 the dairy farmers belonging to the association received 63 per cent of the amount paid by the consumer for milk during the year, the average for the United States showing that the producers get ordinarily but slightly more than 40 per cent. In addition to the return for milk, the stock which is owned practically entirely by dairymen, gives a substantial return in the 10 per cent dividends paid.

The association is now selling fluid milk and ice cream and cheese, and very shortly will be manufacturing and selling butter and condensed milk, if the development of dairying permits. The association handles slightly more than one-third of the milk consumed in El Paso, the daily capacity being about 3,500 gallons.

The association is controlled by a directorate of five, and the management works on a commission basis. A small paper that goes to our members is published semimonthly, and there is also a small paper published by the employees of the association which is distributed in the plant.

The price which the dairy farmers have received for their milk is the highest in this section of the United States, and the price which the consumer pays is below the average for the United States. The business of the association has increased steadily every year since 1916. The members of the association received during 1924 about 3 per cent more for their milk than did dairy farmers who shipped elsewhere. Last year's business amounted to something over \$500,000, and there is no question that this year's business will greatly exceed that amount.

Prospects are that the gross income from agricultural products in the United States for the crop year 1924-25 may reach approximately \$12,000,000,000, compared with \$11,500,000,000 in 1923-24 and \$9,550,000,000 in 1921-22.

Success in cooperation depends on finding men capable of running cooperative associations, on the loyal support of the membership, and on getting a sufficient volume of business.

15. Fence the poultry from house and garden.

16. Have the garden convenient to the kitchen door.

COOPERATIVE MARKETING PRINCIPLES OUTLINED

Geo. C. Kreutzer, Director of Reclamation Economics, describes specific instances which illustrates the principles of cooperative marketing tending to success

DURING the war the hog raisers of the San Joaquin Valley were at the mercy of local buyers and were producing animals of inferior quality and receiving little or no profits. Since California did not have a stockyard system of marketing, these buyers would go out through the country and buy from individual farmers small lots of hogs, make up a carload lot, and then sell them to the packers, making a profit on their various deals. Since these men were speculators, it was to be expected that they would buy as cheaply as possible. Farmers were not producing high quality stuff because the buyers were continually trying to justify their purchase prices by telling the farmer that his hogs were either too large or too small or some other excuse was given to justify the low price offered. It appeared to me that here was an opportunity for a successful cooperative enterprise and that it would accomplish two things: First, to sell the hogs at their true market value, and, secondly, by carefully grading, to encourage the farmer to produce superior quality.

The matter was taken up at community meetings and committees appointed in order that all would thoroughly understand what was needed and what had to be accomplished. The plan was to have the farmers bring their stock to the nearest shipping point and there grade them into carload lots based on quality. We then invited the packers to send their buyers and we would sell these carloads by auction to the highest bidder. Thus prime smooth hogs weighing 175 pounds were classed as A-1 and other cars were made of lesser quality until finally the rough stuff was put into the last car. We found that the packers were anxious to buy the prime stuff and pay a premium for it. The farmer who, through ignorance or carelessness, put in poor stuff found that with only a little effort on his part he could produce A-1 quality and receive therefor the premium price. As time went along and the sales became more numerous the general quality of the hogs throughout the whole valley began to improve and likewise the profits and industry increased.

We organized this as a department of the Farm Bureau and the county agent took a good deal of interest in the activity. We needed very little equipment to do this because the stock pens along the railroad were the places of business. Scales had already been provided, hence the commission of 1 per cent was suffi-

cient to not only operate the institutions but to bring money into the treasury of the Farm Bureau. I am told by the present manager of this institution that they have sold about \$4,000,000 worth of stock and have about \$5,000 or \$6,000 in the bank. They have a sale somewhere every day except Sunday and Monday. The fine thing about this institution was that there was no necessity of creating a debt nor of asking the farmers for a contribution other than putting their stock into the sale.

We also organized a successful cooperative dairy association which marketed the produce of all of the dairies on the Durham State Land Settlement. We based this undertaking on superior quality and service. We started out by borrowing a No. 17 De Laval separator and our output was only \$40 a week. The farmers cooperating took turns turning the handle of this machine, and the cream was sold as sweet cream at 9 cents above the San Francisco quotation, but we were insistent on having quality, and our produce was sold to an ice-cream factory and does about \$200,000 worth of business a year. A fraction of the selling price of the products was taken into the treasury of the association each month to pay for equipment and to pay operating expenses; thus as the business grew the equipment

was increased without creating a debt which ordinarily must bear interest. The Durham Cooperative Dairyman's Association assesses their members only \$3 per cow when they enter the association, and all future improvements are taken out of the selling price of the products.

I do not believe in farmers going extensively into debt in these cooperative associations, because the interest on the debt amounts to more than they could produce under the old system of marketing, and, again, the financial burden often falls on the shoulders of the few loyal ones.

In all of these enterprises, of course, management is the important factor. The Durham Dairyman's Association would have gone on the rocks several times if it had not been rescued by those interested in saving it and who had good business sense.

It is my belief that a successful cooperative enterprise can only be established where you are producing superior quality of products to which shall be attached a superior service and finally where the expenses of selling and managing shall be kept at a minimum. I also believe that any money required to capitalize these enterprises should be largely put up by those receiving the benefits. Any other system is unsound and will sooner or later get into trouble.

I do not believe it is possible to organize a cooperative institution that will handle all kinds of products. Community organizations are the only ones that have succeeded. The point is, I do not think an organization could handle milk, potatoes, grain, poultry, and livestock without getting into trouble. The handling of each of these products is a skilled business; therefore, for any project I believe we should pick out the commodity that needs organization and start with the ones that are the most easy to handle and that need this character of service. However, it will take the undivided attention and interest of some good honest man who has business sense to put any one of them across.

COOPERATION

"L. M. Lawson, superintendent of the Rio Grande project, recently requested a conference with farmers to consider ways and means of improving the present system of distributing irrigation water from the Bureau of Reclamation canals and laterals. This shows a fine spirit of cooperation on the part of our project superintendent. Mr. Lawson has directed reclamation work on our irrigation system for many years and has his heart in this great achievement to an extent that few of us realize. That Mr. Lawson is vitally interested in perfecting every detail of his project before it is finally turned over to the water users is shown by this conference with farmers. This conference is also a strong testimonial from one of the biggest men in the Rio Grande Valley to the fine spirit of cooperation now existing among all organizations in this project."—Rio Grande Farmer.

The national farm power survey by the Department of Agriculture shows that the present consumption of electricity on the farms of the United States is considerably less than the power load required in pumping for irrigation and drainage.

SOUTH AFRICAN IRRIGATION ENCOUNTERS DIFFICULTIES

The settlers are meeting conditions in many respects identical with those on the irrigation projects of the Bureau of Reclamation, necessitating changes in the laws covering repayments

THE Midland News and Karoo Farmer, published at Cradock, Cape Province, South Africa, contained recently a series of articles on the development of irrigation in South Africa, covering in general the history of irrigation in that Province, calling attention to the agricultural depression following the World War, and concluding with the statement that the "new era is full of promise, that petty recriminations must be a thing of the past, and that settlers must be aided in their early efforts." The following brief extracts, indicating that human nature is much the same the world over, will be of interest to students of irrigation problems in the United States:

"That irrigation has not yet proved itself to be the success that was anticipated can not be denied. Did it prove an immediate success in other countries? For many years it was a dream; now it has passed from a dream to a reality, but it has forged a new link in the chain of progress. It is not difficult for an unprejudiced mind to admit the reasonableness of the claim that no Government could have done more to aid the growing desire for irrigation development, supported as it has been by a loyal and hard-working staff of engineers. The new era which is dawning, and which was so well outlined by the honorable the Minister for Lands at the Irrigation Congress in Johannesburg, for the settlement of lands already under irrigation and the cessation of the program of large construction until such time as this has been done, is full of promise.

"Mistakes have been made in the past, no one is free from blame entirely, but the mistakes have been honestly made both by the Government, engineers, farmers, and settlers. Proof has been furnished with painful frequency that the areas held by individual owners are too large for development by them with the limited means at their disposal. The long-cherished hope of speculation in land at the expense of the State has departed; with it we see a great cry going up to the Government to help, which has not been in vain. It is to be hoped, now that the Government has stated its intentions, the individual will be able to concentrate on the development of such limited area as he can personally supervise and that the State will take over the balance of the land at its true value and assist to settle it. The mere constructing of irrigation works does not increase the true value of land; it does, however, increase its possibilities.

"It has been deplorable to note how for some time past there has been a growing tendency to blame the Government and their officials for the failure to do what now may appear obvious but has only become so in the light of experience.

"Can anyone deny that the many local and parochial differences of opinion between those who have been entrusted with the carrying out of cooperation schemes with State funds, to say nothing of the petty recriminations among the users of water, have retarded the progress of land settlement under irrigation schemes and driven away many of those whom it is most desirable to see settled in the fertile valleys of the Midlands and Eastern Province? Read what the liquidators of an important irrigation settlement say in their report:

"One thing is certain, that unless settlers and others cease harping upon the past and realize that recriminations do not improve the general prospects of those interested, but instead devote themselves to making a success of their various undertakings, the ultimate success of the irrigation scheme and the prosperity of the settlement will only be delayed thereby, and the people who will derive the benefits may not be the present holders, but their successors."

"In conclusion, the following remarks by Dr. Elwood Mead, than whom no one has a greater right to speak with authority, may be of interest:

"It is too much to expect the average settler unaided to bridge the gap between raw land and farm that will support him; financial or engineering aid, sometimes both, are needed.

"As carried out by the Government or ordinary private enterprise, even our most complete irrigation projects do not clear the land, level it off into suitable checks, and throw up borders; laterals and boxes are not put in, nor are the best methods of irrigation determined and laid out. But all these detailed improvements, which have to be made before the first crop can be seeded, are quite as essential to the success of the new settler and are often

more costly than the canals and reservoirs themselves.

"It is, therefore, most unwise to leave all this work, which is not farming, but rather engineering, for the inexperienced settler. In his hands it is likely to cost twice what it would, and at a time when there is no income from the land the necessity for any considerable outlay may spell failure for the individual. It is men with small capital who are most often attracted to the irrigation projects, and these are the men we must continue to attract by making the farming of such land a venture within the reach of limited capital."

As indicating the lessons which South Africa has learned and how they agree with the recommendations of the Committee of Special Advisers on Reclamation for the irrigation projects under the Bureau of Reclamation, the following from a recent letter from Mr. A. D. Lewis, Director of Irrigation of South Africa, is of especial interest:

"Our irrigation works are very expensive, as we have very little permanent water and have to rely on storage dams to catch irregular floods. An approximate figure of cost would be about \$100 per acre. The cost has to be repaid over varying periods, usually between 20 and 60 years, with an average of about 40.

"At first two free years were allowed after completion of the works and then a full uniform rate became due. Two years ago we altered the act and allowed four years of reduced payments following the two free years, and now we are contemplating altering the four to eight.

"The land is nearly always in private ownership and usually in areas much bigger than the owners can work. In some cases a single owner holds as much as 4,000 acres. This has been the cause of all our troubles and we are endeavoring to remedy them."

Apparently these two great sister nations have reached much the same conclusions concerning the future success of irrigation development and the modifications of the law which alone will make this success possible.

OREGON APPOINTEE ON SECRETARY'S BOARD

W. A. Delzell, of Salem, Oreg., has been designated by the governor of Oregon and appointed by the Secretary of the Interior to serve on the Board of Survey and Adjustments.

The notable record already made by the American farmer in the profitable use of labor-saving equipment of all types would seem to warrant the next step of making larger and more diversified use of the most convenient and flexible form of power, electricity.

RECREATIONAL UNITS ON PROJECTS

THE Joint Committee on Recreational Survey of Federal Lands, cooperating with the President's Committee on Outdoor Recreation, has undertaken to gather information to aid the President's committee in formulating a national policy on outdoor recreation.

In furtherance of this plan, a survey is being made of the recreational possibilities on Federal lands and waters as a basis for developing Federal policies of land use, in which outdoor recreation will have its proper place.

The first step in this survey was the preparation of a questionnaire, copies of which have been sent to each project

superintendent with a view to eliciting definite information concerning recreational units on the projects.

Virtually all the projects have responded with complete information concerning their recreational possibilities, and these replies have been supplemented in the Washington office with photographs of the various reservoirs and other recreational units and with descriptive articles which have appeared from time to time in the NEW RECLAMATION ERA.

The recreational possibilities of many places on the projects, from the standpoints of fishing, camping, boating, scenic attraction, etc., have been well

recognized for many years. This survey affords an excellent opportunity to correlate these possibilities and, through the printed report, which doubtless will appear later, to bring them prominently to the attention of the public generally.

Reports concerning recreational units on the projects have so far been received as follows:

Orland project, California.—East Park Reservoir.

Uncompahgre project, Colorado.—Grand Canyon of the Gunnison; Picture Rocks; Ouray Memorial Park.

Boise project, Idaho.—Arrowrock Reservoir; Deer Flat Reservoir; Black Canyon Reservoir.

Minidoka project, Idaho.—Lake Walcott; Jackson Lake.

Huntley project, Montana.—Pompeys Pillar Rock.

Milk River project, Montana.—Nelson Reservoir.

Sun River project, Montana.—Sun River Canyon.

Lower Yellowstone project, Montana-North Dakota.—Joes Island.

North Platte project, Nebraska-Wyoming.—Pathfinder Reservoir; Lake Minatare; Guernsey reservoir.

Newlands project, Nevada.—Lahontan Reservoir; Lake Tahoe; Pyramid Lake.

Carlsbad project, New Mexico.—McMillan Reservoir; Avalon Reservoir; Carlsbad Cavern.

Rio Grande project, New Mexico-Texas.—Elephant Butte Reservoir.

Umatilla project, Oregon.—Cold Springs Reservoir.

Klamath project, Oregon-California.—Clear Lake Reservoir; Lava beds.

Belle Fourche project, South Dakota.—Belle Fourche Reservoir.

Strawberry Valley project, Utah.—Strawberry Reservoir.

Okanogan project, Washington.—Conconully Reservoir.

Yakima project, Washington.—Tieton Reservoir; Pumping Lake; Lake Cle Elum; Lake Kachess; Lake Keechelus; Clear Creek Reservoir.

Riverton project, Wyoming.—Pilot Butte Reservoir.

Shoshone project, Wyoming.—Shoshone Canyon.

FREE RECLAMATION

EDITORIAL FROM THE RENO GAZETTE

IF Nevada expects a continuance of Federal reclamation, and she certainly does, she will not be led astray by specious arguments that the cost of construction, which is now repaid by her settlers, should be borne by the Government upon the theory of national benefits received.

The State has just been visited by the Secretary of the Interior and the Commissioner of Reclamation, both of whom have been requested to give their active support to the prosecution of the Federal projects already authorized or under way. Next month the Reclamation Committee of the House and a special reclamation commission headed by Thomas E. Campbell and Prof. John A. Widtsoe will come to the State to view the Newlands project and the proposed Spanish Springs unit. The two parties will be composed of men who are convinced that Federal reclamation must be placed upon a sound business basis and not treated as a pork-barrel enterprise, and the advancement of the latter theory can be productive of nothing but harm to Nevada.

The fact is that neither Nevada nor any other State can consistently ask for the free reclamation of its lands. And if any such plan were adopted by the Government, it would practically end Federal reclamation in Nevada, for the excellent reason that in many other States, particularly in the South, there are millions of acres of cut-over and swamp lands that can be reclaimed far cheaper than those of the Rockies.

The Gazette would repeat again that the present reclamation law and the fund which it provides restrict reclamation to the Far West, which maintains the reclamation fund through the sale of its public lands and its oil royalties. Once the principle of repayments is abandoned the fund will almost wholly disappear and any fund created from Treasury appropriations would become available to all the States. In the scramble that would ensue, and with the relatively cheap projects that could be brought forward by other and more powerful States, Nevada's opportunities for recognition would be small indeed.

The principle of repaying construction costs is sound. By its application the settlers become the absolute owners of their engineering works, water rights, and lands. They are not held in the permanent position of Government wards, nor of persons living upon the bounty of the public.

Nevada is not requesting something for nothing. She is not soliciting gifts. She proposes her reclamation projects as sound business enterprises that will fully repay their costs. She is not asking that the Government venture upon a scheme of paternalism that is contrary to all of its recognized and established principles.

Good, sound growth in the cooperative movement has been somewhat retarded in recent years by overenthusiastic persons who have held it up as a panacea for all the ills from which the farmers are suffering. The mere organization of a cooperative association is not the end to be attained. It is only the beginning.

GUERNSEY DAM CONTRACT AWARDED

A CONTRACT for the construction of the Guernsey Dam on the North Platte reclamation project in Nebraska and Wyoming was awarded May 4 to the Utah Construction Co., Salt Lake City, by the Interior Department.

The company's bid to build the dam was \$1,288,121, which is within the engineering estimate of the Bureau of Reclamation. Bids for the building of the dam were opened on March 10, 1925, at Mitchell, Nebr. The Utah Construction Co. was the only bidder for the contract.

The act of December 5, 1924 (Public, No. 292, 68th Cong.), contains the following appropriation:

North Platte irrigation project, Nebraska and Wyoming: For continued investigations, commencement of construction of the Guernsey Reservoir and incidental operations, \$800,000.

The act contains the following proviso:

Provided, That no part of the sums herein appropriated shall be used for the commencement of construction work on any reclamation project which has not been recommended by the Commissioner of Reclamation and the Secretary of the Interior and approved by the President as to its agricultural and engineering feasibility and the reasonableness of its estimated construction cost.

Both the President and the Secretary of the Interior have approved of the Guernsey Reservoir and power plant in accordance with these terms of the law.

The estimated cost of the dam, in round numbers, is \$1,780,000. The estimated cost of a 2,500-kilowatt power development at the dam is \$325,000. To the foregoing must be added (a) \$121,000, most of which has been already expended in connection with surveys and investigations, the purchase of flooded lands, and road construction, and (b) \$290,000 needed in connection with a subsidiary power plant at Lingle, Nebr., and transmission lines connected therewith. The total estimated cost of the dam and power development therefore aggregates \$2,516,000.

To recoup this expenditure the Government may look to the following sources: (a) the Interstate division of the North Platte project. The landowners on this division have agreed in the manner provided by the act of Congress of August 13, 1914 (38 Stat. 686), to an increase of the construction charge against their land of \$16 an acre, a part of which it is provided may be utilized for the building of the Guernsey reservoir, including a 2,500-

kilowatt power development. From this source it is estimated that a return of \$966,000 will be available for the Guernsey reservoir and power development; (b) the Northport division of the North Platte project, from which, under contract with the United States, a total of \$134,000 is to be paid for the Guernsey reservoir and power development; and (c) the Fort Laramie division of the North Platte project, on which construction charges have not yet been announced, but these charges when announced will include a rate per acre which, in addition to other amounts, will produce a return of \$885,000 applicable to the cost of the Guernsey reservoir and power development. These figures aggregate \$1,985,000.

The above amounts are to be returned from the North Platte project which has been under development for a number of years. From existing knowledge of the agricultural conditions on the project, it is believed that the water users on the Interstate, Northport, and Fort Laramie divisions will be able to pay, within the period allowed by the reclamation law, their construction charges, including items in the amounts stated above, for the Guernsey Dam and power development.

It will be noted that the anticipated returns from the Interstate, Northport,

and Fort Laramie divisions of the North Platte project fall short by approximately half a million dollars of producing sufficient returns to repay the entire estimated cost of the development. The remainder, however, will be obtained from the net revenue which will be derived from the sale of power which has been and will be developed at the Guernsey reservoir. The act of March 3, 1925 (Public No. 580, 68th Cong.), provides: "That all net revenues from any power plant connected with the Guernsey Dam shall be applied to the repayment of the construction costs incurred by the Government on the project, until the obligations are fully paid." The contracts already made and pending insure a net return of about \$40,000 per annum, which will pay off the remainder of the construction cost of approximately \$500,000, in less than fifteen years. There is also a possible increase in revenue from the sale of additional water for irrigation, as the reservoir will have a capacity considerably in excess of the requirements of the areas hitherto named, which will contribute to the repayment of these costs, and the sale of this surplus water to other lands would expedite the payment of construction costs.

The bureau has investigated, in a preliminary way, several prospective projects in Wyoming and Nebraska to which the surplus water in the reservoir could be sold, but the investigations have not been carried to a point where positive forecasts can be made regarding such sales. This, however, is not necessary.



Lined section of Cross Cut Canal, Salt River project, Ariz.

SOME HELPFUL IRRIGATION RULES

1. KEEP the ditches in order. A sluggish current increases the water loss.

2. Line the ditches with concrete, or lay cement pipe lines. This settles the problem of seepage loss permanently and almost eliminates ditch maintenance.

3. Grade the land surface evenly. High places become "slick," low places invite watergrass, sun scald, and puddling of the soil. The "lands" should be level crosswise, but with adequate fall lengthwise.

4. Plow deeply. Deep-plowed soil utilizes all of the rainfall, takes the irrigation water more readily, forms a mulch quickly and permits better aeration.

5. Use short lands for light soils. The best length depends mainly upon the character of the soil, but also on the slope and on the head of water available.

6. Divide a large head of water into "unit heads" of such size as to give uniformity of irrigation throughout the length of furrow or land. If the upper ends of lands get too much water, divide the head into fewer lands or order a larger head; if the upper ends get too little, irrigate more lands at the same time. Larger unit heads are needed on lighter soils, flatter slopes, or longer lands or furrows.

7. Test the soil the day after irrigating to determine the depth of water penetration. Use a soil auger, a pointed rod, or a shovel. Ascertain if the water penetra-

tion is about right and whether it is uniform from end to end of lands or furrows.

8. Irrigate before planting. Have the soil well stored with water to a depth of 4 or 5 feet. Then allow a good root development before the next irrigation.

9. Do not overirrigate. An excess of water is an injury. Many crops do not require heavy irrigations. Even alfalfa can be given too much at a time.

10. Do not hesitate to irrigate at night. The big projects run water continuously. Why should not a pump irrigator also? The evaporation loss is much less at night. Pumping plants should be operated night and day through the hot growing months.

11. Irrigate at the most favorable time. Irrigate alfalfa when two-thirds grown, but not just after cutting; grains when just out of boot; and corn when in tassel and silk.

12. Examine the soil occasionally. Bore or dig into it at least 3 feet. Does it pack nicely in the hand? Irrigate when soil and crop indicate the need of water and not according to calendar. There should be always some reserve moisture in the soil to prevent wilting and to assure a profitable yield.

13. Cultivate. A loose soil mulch prevents baking and cracking of the soil and permits aeration of the roots. Cracks permit heavy losses by evaporation. Use

an alfalfa renovator in August, in late fall, and in spring if alfalfa has been pastured. Row crops need cultivation after each irrigation, though in cases of cotton, corn, and milo cultivation is not possible in the latter part of the season.

14. Fight the weeds; eradicate them. Weeds rob the crop of water, sunshine, and plant food.

15. Rotate the crops; keep the soil fertile. Use alfalfa in the rotation; grow legumes and plow them under; all crop residues, straw, and stalks should be plowed under.

16. Do not irrigate the roads. Your neighbors do not appreciate this. Keep the gophers out of the ditch banks, shut off the water in time, and the highways will not become bogs.

17. Measure the water. Set a weir on your supply ditch. Are you getting as much water as you pay for? Do you know how much each crop is using? You measure everything else; why not the water supply?—*Bulletin 101, Arizona Agricultural Experiment Station.*

STATE COOPERATION IN RECLAMATION WORK

Last December Congress authorized the appropriation of \$100,000 for investigations to determine how arid and semi-arid, swamp, and cut-over lands may best be developed. The language of the authorization limits the investigation to the development of these lands, but no area is truly developed until it is settled and put to human use; and the problem of how to select the settlers and how to help them become established in permanent homes is more important than a study of how to dig ditches or pull stumps.

The States of North and South Carolina have carried on investigations and made able reports on rural conditions and on settlement problems. The interest taken by these State governments and by their agricultural colleges indicates that here is a friendly and fruitful field for the use of a part of this appropriation.

The investigation, if undertaken, should deal with neglected lands, where settlement can begin with the least preliminary outlay, where money and effort can be saved for the improvement of the farms and financing the settlers. There should be gardens and comfortable houses for farm workers who have no capital, and money to help complete the development of farms when settlers have from \$1,500 to \$3,000 of their own. The chief satisfaction the country can give is a mode of life superior to that of the city, and the basis of that to the wage worker and farmer must be ownership of his home.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1925



Excellent potatoes are grown on the Shoshone project, Wyo.

NEW RECLAMATION ERA

VOL. 16

JULY, 1925

NO. 7



SHOSHONE DAM AND RESERVOIR, SHOSHONE PROJECT, WYOMING

“WE are committed to a development of all feasible reclamation projects. That is the policy of the Administration. It must be remembered, however, that no new project is feasible unless it can be settled and that no old project from which the settlers are leaving and to which new farmers can not be attracted will ultimately survive.

“The Reclamation Service can build irrigation works, but it can not draft settlers. We hope States, railroads, and chambers of commerce will cooperate with us to this end. Local towns and States will be the first beneficiaries from new projects, the Government will be the last. The first intention of reclamation was to build homes. We want to insure the ownership of these homes to those who make them.”

*HUBERT WORK,
Secretary of the Interior.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

JULY, 1925

No. 7

PROBLEMS THAT MUST BE MET IN FUTURE RECLAMATION

Since the purpose of the act was to create home-owning farmers, our first care should be their welfare. The human element involved in reclamation should be our first concern

By the Secretary of the Interior

CONGRESS made appropriations last winter for new reclamation projects which will cost when completed between \$50,000,000 and \$60,000,000. Other projects authorized by earlier Congresses and partly completed will bring the total construction cost of new works to \$110,000,000. Together these different structures will provide water for more than 400,000 acres of land, or about 10,000 farms. The construction costs will be much higher than on the older projects, the estimates ranging from \$100 to \$160 an acre. Expenses for farm development will also be higher than before the World War.

The States and communities where these projects are being built or contemplated are exceedingly interested in this construction. Rarely a day passes that an appeal for early action does not come to the Interior Department. The department is being pressed to investigate and undertake additional projects in many new localities. The necessity for this development is fully realized, and I am anxious to bring about the accomplishment of these ends if it is feasible to do so.

But there is another side to reclamation. Conditions on some of the older projects convince me that before development goes much farther the plain facts experience has developed should be discussed on the ground with those interested, that we may have the same information.

There are projects from which come continued protests against being called upon to pay either construction costs or operating expenses.

Before I became secretary a cost review board had dealt with these protests against payment of charges. There have been moratoriums and postponements of payments dating back more than 10 years. It would seem, therefore, that before we begin on this new program of construction where the average cost will be nearly double that of the older projects we ought

to determine what is wrong and if possible travel in a new direction.

If the fault is inherent in irrigated agriculture, then reclamation construction should cease until the profits of agriculture improve. If it is due to bad management or defects in our past policy, then we should understand what those errors were

SECRETARY TO MAKE TRIP TO PROJECTS

Secretary Work and Commissioner Mead are making another trip to a number of the projects, including Shoshone, Sun River, Yakima, Kittitas, Tieton Dam, Baker, Vale, King Hill, and American Falls Dam. They left Washington about the middle of June and expect to return about July 17.

Writing to the project superintendents and district counsel concerning the trip, Commissioner Mead pointed out that "the most serious feature that confronts the bureau is the failure of water users to meet their payments, especially operation and maintenance costs."

"It is realized that the hard times encountered by farmers everywhere during the last three or four years are largely responsible for this situation, but the Reclamation Bureau is a service and not a credit agency. There is a growing feeling in Congress that works should not be operated where current operating expenses can not be met, and serious criticism of the bureau for accepting payments from one settler who makes great personal sacrifice to fulfill his obligation to the Government and permits other settlers who may be in a better position to evade the obligation by the simple expedient of not paying."

and change them before we go farther with this new construction program.

On older projects there has been one fundamental mistake in the past. When payments were not made, instead of facing the situation and undertaking to ascertain the real situation and deal with it in the open a weak and temporizing expedient of deferring payments by giving blanket relief to all water users on a project was adopted. Under these moratoriums delinquent payments on operation were added to operating expenses. These blanket moratoriums gave no permanent relief to the struggling settler who had made his payments. They often did give relief to the well-to-do landowner able to make his payments by enabling him to escape.

Blanket relief does not give the tenant any better chance. He has to pay just as much rent as before. It does save the landlord from paying. Blanket relief is urged by bankers and business men because if the Government is not paid then their chances of receiving interest, having loans paid off, or having store accounts reduced are all improved. We have been discouraging blanket moratoriums. Whatever relief is given should be individual and based on the necessities of the individual. Where land is cultivated by tenants, it must be the inability of the landlord to pay that we should consider only.

Moratoriums do not offer relief from the burden of private debts on which settlers are paying a rate of interest which agriculture can not stand. They afford no relief to the mortgage foreclosures which menace many farmers. The Reclamation Bureau should not be called upon to operate and maintain canals without payments for the service rendered.

Within six months on one old project there were 206 farm foreclosures; on another a single individual recently foreclosed on 18 farms. On another one bank

(Continued on page 98)

RECLAMATION POLICY BASED ON ECONOMIC PRINCIPLES

In the light of more economic knowledge, divergent policies may be merged, coordinated, and modified with a view to the adoption of a sane reclamation policy which is economically sound

By Prof. David Weeks, University of California

RECLAMATION of arid, swamp, flood, and cut-over lands has been a subject of many controversies in Congress, in State legislatures, and in numerous other official and nonofficial bodies. At present there are three reclamation policies in existence, each of which represents the point of view of a fairly large class of American people.

One of the policies may be stated briefly: "Reclaim no more land"; another—"Reclaim land, create financial machinery and reclaim more land"; while the third group insists that reclamation development should be governed solely by supply and demand.

Senator McNary, of Oregon, chairman of the Senate Committee on Irrigation and Reclamation, will introduce in the next session of Congress a bill "to encourage the development of the agricultural resources of the United States through Federal and State cooperation." Under this measure any district in any State would be able to secure temporary financial aid from the Federal Government for reclamation, provided State laws contain provisions whereby bonds may be issued by the district as a first lien on all the lands within its boundaries. The feasibility of the project would be determined by the Secretary of the Interior subject to review by Congress.

Feasibility is the keynote of the proposed legislation, and upon this word hinges the success or failure of the Senator's bill. Feasibility has within its five syllables all that engineering, agricultural, and economic investigations can determine, and then some.

Feasibility is dependent upon physical factors, such as soil, drainage, water supply, and workmanship of construction.

Feasibility depends upon climatic factors, such as rainfall, length of growing season, and range of temperature.

Feasibility most of all depends upon economic factors, and upon economic principles rests the future not only of each individual project but the successful administration of the whole plan. The first cost of raw land is not as important as the cost of its agricultural development. Costs of construction, costs of preparing land for irrigation and cultivation, costs of building houses and barns, costs of buying livestock, costs of buying equipment, and costs of planting and bringing crops into production form one important group of economic questions to

which we have not given proper consideration in the past, but which must be considered in the determination of feasibility.

Marketing and transportation facilities, crop adaptation, costs of production, and gross returns—not only cost of production and gross returns to-day but for the years to come—must be estimated in the determination of feasibility. Costs of production and gross returns over a long period of time are a complex study and are closely related to the operation of the law of supply and demand. If this were a simple law of nature, it could be examined by experimental processes. The whole study is, however, complicated by paucity of information, by human emotions, fickleness, changing desires, and prejudices. One of its most disturbing features is its slowness of operation.

When prices are high, there is a tendency for a smaller quantity of a product to be consumed and for greater quantities to be produced. Periods of high prices are periods of agricultural expansion. When prices are low, the opposite tends to be the result. Tendencies, however, are often upset for a time by disturbing influences. A low price of dairy products will often result in many farmers adding to their herds in order to bring their income up to its former level. After a time one dairyman after another will change from dairying to some other type of farming or will discontinue farming entirely. On the other hand, many farmers will hesitate for a time to build new dairy barns to take advantage of a rise in price. The response gradually takes place, however, and there is an increase in supply. This is only one type of instance illustrating the prevalence of influences which disturb the operation of the law of supply and demand. Numerous other instances could be given of this retarded response of supply to price change.

These irregularities are much more pronounced in regions where agricultural production is largely on reclaimed lands, as it is in the West. As a rule in reclaimed areas, agriculture is more intensive. Crops are more permanent in character. A period of high prices which indicates an increased demand is followed in the first instance by an expansion of the area under irrigation. Many new projects are organized during this period, but the construction is spread over a period of four or five years. Perhaps by the time water is available, prices have gone down,

but the lands within the irrigation projects must be developed or be confiscated by the overhead charges brought about by the new construction.

As a result thousands of acres of trees, vines, and alfalfa are planted which by the end of 3 or 4 years come into full bearing. Alfalfa, of course, does not take so long, but it does take time for the new farmer under irrigation to purchase necessary equipment and livestock. Thus about 9 or 10 years after development has been started by the demand impulse of maximum prices only part of the lands have been brought under full production. Much of this development is carried on during years of depression in the face of negative public sentiment in regard to agricultural expansion. A large part of the lands, due to high costs of development in proportion to current prices, wait for another cycle of high prices to be brought under cultivation. This retarded development has resulted in financial distress of thousands of farmers and failure of many irrigation enterprises.

Because of these complex irregularities a plan might be suggested which is a modification of the attitude toward letting development drift along in a rather haphazard fashion in response to supply and demand. Such a plan would contemplate a careful study of the operations of this and other economic laws with a view to meeting crises before they occur.

In California we are endeavoring by the investigation of actual rural conditions to develop a practical method of economic analysis of agriculture and agricultural lands under irrigation. There is much yet that we do not know, but one by one we are eliminating the uncertain factors upon which feasibility depends. In the light of more economic knowledge, divergent policies could be merged and coordinated with a modification of the one placing sole dependence upon supply and demand. This should bring about a sane reclamation policy which is economically sound.

The training of professional men equipped with understanding of these difficult problems, the education of the public, especially those directly concerned in agriculture and reclamation development concerning the purpose and need of special knowledge of this kind, will do much to prevent unwise and ill-timed development and yet permit a wholesome expansion of our agricultural resources.

SAVE IRRIGATION WATER AND GROW MORE CROPS

The problem of securing sufficient water for the production of the apple crop on the Okanogan project is the most serious problem now facing the growers.—One solution is more economical use of water

By Victor Morgan, in the Omak Chronicle

WHERE a locality is subject to ever-recurring water shortage, the very best use of such water as is available should be the concern of all who irrigate. In order to make an economical use of irrigation water, certain fundamental facts must be understood.

Water applied to land will disappear in one of the following manners: (1) Used by plants, (2) run-off, (3) evaporation, (4) percolation. The use of water by plants is desirable. In this way food is made available and wilting prevented. If any of the other three occur, water is going to be lost, and consequently they should be prevented as much as possible. Run-off is never much of a problem, and evaporation can be controlled fairly well by cultivation. There is, however, always more or less of a loss of irrigation water by percolation or seepage. This will occur as soon as a soil reaches the limit of its water-holding capacity, and as soon as that point is reached no more water should be applied, as it will do no good, and not only does it do no good but it invariably does some harm. In some sections the continued heavy applications of water on upper benches have resulted in large areas of alkali land on the lower levels. Also the loss of plant food by leaching of the soil is quite an item. When any considerable amount of water passes downward through the soil, there will be a rather large percentage of soluble plant foods such as nitrates carried down with it.

The economical use of water practically means the prevention of percolation. To do this the person irrigating will have to know three things: (1) What is the water-holding capacity of the soil and in what length of time is that capacity reached after water is applied? (2) What is the least amount of moisture in the soil that the trees will stand without injury and how soon will that point be reached after irrigation? (3) How fast does the water spread sideways from a furrow?

The first of these three is important because, as has already been pointed out, when the limit of the soil's water-holding capacity has been reached percolation will take place and the water will be lost. Most soils have a fairly definite water-holding capacity, depending upon the size of the soil particles. Very fine clay will hold the most moisture and sandy soil will hold the least. After many

moisture tests I have found that the orchard soils of this region will hold about 13 to 15 per cent of moisture, by weight. Some of the land that has been in cover crop for a number of years and contains considerable humus will hold about 17 to 18 per cent of moisture. These figures represent the water-holding capacity.

CONCLUSIONS BASED UPON EXPERIMENTS

1. That shorter irrigations are essential to the economical use of water.
2. That 12 hours is as long as it is necessary to run water. Any longer will result in waste.
3. In case of necessity 8 hours of irrigation will do.
4. That shorter furrows and more of them must be used.
5. That the 14-day period commonly used is too short early in the season and too long in the hottest part of the season.

It is also necessary to know about how dry the soil can get without injuring the trees. I have taken samples of soil surrounding trees upon which the apples were beginning to get a little soft and found that the moisture content ranged from $2\frac{1}{2}$ to 4 per cent, depending somewhat upon the kind of day. Ordinarily the soil can get as low as 5 or 6 per cent and no harm result. It is desirable to approach this per cent as closely as possible before irrigation is begun, as the following explanation will show.

The actual quantities of water that the soil will take for any irrigation will lie somewhere between the water-holding capacity of, say, 16 per cent and the per cent of moisture which the soil contains when irrigation is begun. If the soil contains from 12 to 15 per cent of moisture when irrigation is started, as sometimes happens at the first or last irrigations of the season, obviously about 4 per cent of moisture is all that can be added, and as soon as the available pore space (pore space is the open space between soil grains not actually occupied by soil grains) in the soil is used up the remaining water has to find some place else to

go. It is very important that it be clearly understood that the soil will only hold a certain quantity and that that quantity is not very large if the soil is wet when irrigation is started. If the orchard soils in this region were underlain by a heavy clay as are soils in some sections, instead of gravel, the water would be found standing on top, following many irrigations. The following computation will illustrate this point:

For example, when irrigation is begun the soil contains 12 per cent of water and 16 per cent is its water-holding capacity; then 4 per cent is all that can be added. On the other hand, if the moisture content gets as low as 6 per cent, 11 per cent can be added, or about three times as much. Not every farmer will want to make moisture tests, but this point is emphasized because of the fact that if there is little room for water in the soil when irrigation is begun some waste of water will certainly occur.

So far it has been explained why it is well to know the water-holding capacity and the wilting point of the soil. The third factor of importance is the rate of lateral capillarity. This can be determined fairly well by the use of a shovel. It is not necessary to wet the soil to a distance of more than 18 inches below the level, as there is very little good soil and nothing much that the tree wants in the way of plant food below that level. Most of the available plant food will be found in the top 8 inches of soil where the remains of countless plants that have lived and died have been added to the soil and have become one of the chief sources of plant food. Many will argue that there are roots down as far as 3 and 4 feet and that therefore they should have water. There is hardly any doubt but that the water was put there first by overirrigation and that, naturally enough, the roots followed. Also in cases where the soil is gravelly water at that distance will not rise to the top, as water can not rise by capillarity in gravel.

The person irrigating should know how fast the water spreads outward from the furrow in order to know how close to place his furrows and not as a guide to the length of his irrigation. The proper length of irrigation should be determined in other ways, as has already been shown, and the distance between furrows adjusted accordingly. In eight hours water

(Continued on page 102)

DEVELOPMENT OF WYOMING'S IRRIGATION RESOURCES

Without aid in farm development none of the projects built under war prices is feasible. Settlers with money enough of their own to change this raw land into farms will not come

By the Commissioner, Bureau of Reclamation

THE greatest economic problem of Wyoming is how to secure the complete development of the State's irrigation resources. Future population and wealth depend on this being made an agricultural State. Mines will be worked out, forests cut off, but the irrigated farm will endure. The kind of people who live on these farms and the kind of agriculture they follow will determine the character of the State's civilization and its material prosperity. As a part of that development the Federal Reclamation Bureau is building three projects in this State. In addition, investigations are being made of three additional projects. When they will be built will depend quite largely on the results of settlement and agricultural development on the older works.

RIVERTON PROJECT

The Riverton project has an irrigable area of 100,000 acres, 69,000 acres of which is public land and 30,000 acres in private ownership. The irrigation works will cost \$8,350,000. Water rights for the first-class land will cost about \$100 an acre. Before the first unit is available for settlement the Government will have invested \$2,800,000. When the works are all completed, 1,500 farms will be needed to settle and cultivate the land as

SAVE IRRIGATION WATER

(Continued from page 101)

will spread 2 feet each way from a furrow and therefore seven furrows are not any too many for a 30-foot tree row.

The economical use of water consists in getting the water onto the land in a short period of time. If an 8-hour period has been used, only one-third as much water will have been applied as in a 24-hour period.

I have made dozens of moisture tests on land irrigated 8, 12, 24, and 48 hours and have never found that the moisture content of the land irrigated the longer periods was consistently any greater than that irrigated the shorter periods. The soil may look wetter at the end of a long irrigation, but that is simply because the water can not run through the soil as fast as it is put on top. As soon as seepage can take place and the excess water has time to disappear (about 24 hours) the soil irrigated 24 or 48 hours will be found to contain no more moisture than that irrigated 8 or 12 hours.

irrigation requires, and this land will produce crops having an annual value of approximately \$2,000,000. Before this can be done settlers must be secured, and these settlers will have to begin with land unfenced, unleveled, covered with sagebrush, with everything needed to make it fit for human habitation remaining to be done. The improvement and equipment of these 80-acre farms will cost from \$5,000 to \$8,000 a farm, and the total capital required to change the raw land into farms will be somewhere between \$6,000,000 and \$9,000,000. If settlement is to be unaided, as it has been in the past, this development will be slow and the returns to the Government disappointing. The successful settlement and development of the land is therefore the most serious problem connected with this project.

SHOSHONE PROJECT

The Shoshone project is intended to utilize the water of the Shoshone River. The estimated cost of the irrigation works is \$23,536,000. Water can be delivered to 216,000 acres of land, making the average cost of a water right more than \$100 an acre. The project is divided into five divisions, two of which, Garland and Frannie, have been settled. The undeveloped portion comprises an area of 144,000 acres lying in three divisions as follows: Willwood with 15,600 acres, Hart Mountain with 38,800, and Oregon Basin with 90,000 acres. Approximately all of the undeveloped area is in Government ownership and will require 1,800 settlers, who must be drawn mainly from outside the State.

WILLWOOD DIVISION

The canals and laterals on the Willwood division are sufficiently advanced to insure water for half that area during 1926 and for complete irrigation during the following season. The investment of the Reclamation Bureau in reservoirs and canals will be about \$100 an acre. Full settlement of this division will require 200 families and necessitate an investment in the clearing and leveling of land, improving and equipping farms of \$1,000,000 to \$1,500,000. The estimated annual crop return if these farms are fully improved is \$400,000.

Judging by past experiences it is believed that with careful selection of settlers now provided by law, but with no special

provision for financing or otherwise aiding farmers, not more than 50 per cent of the land would be settled in the first five years after public notice.

HART MOUNTAIN DIVISION

The irrigable area of the Hart Mountain division is estimated at 38,800 acres. The total cost is estimated roughly at \$4,850,000, or approximately \$125 an acre. Settlers for this division must be secured from older agricultural districts, and this settlement will be facilitated or retarded in proportion to the arrangements made for giving aid and direction in agricultural development. To cultivate properly the 38,800 acres of irrigable land in this unit will require approximately 500 farmers. If this development is to take place promptly, these 500 farmers must expend from \$2,000,000 to \$3,000,000 in improving and equipping their farms during the first five years. For reasons to be stated hereafter it is believed that a considerable portion of this money must be provided by private or governmental organizations. The settler will not bring it to the project.

OREGON BASIN DIVISION

The Oregon Basin division when completed will constitute the largest single unit of the Shoshone project. It has 90,000 acres of irrigable land and will cost approximately \$9,630,000, or about \$110 an acre. The capital required for the expeditious development of the farms on this area would be between \$6,000,000 and \$10,000,000. Without organized financial backing for settlers by which money would be provided at a low rate of interest and on long terms of repayment, the successful development of this area would undoubtedly be delayed many years, with a consequent economic loss to the State and the Nation. With this area fully developed and farms properly improved, the annual crop values should be between \$1,500,000 and \$2,500,000.

The area in all three of the undeveloped divisions is mainly Government land, not susceptible of agriculture without irrigation because of the limited rainfall. Appropriations have not been requested of Congress for the construction of the two last-named divisions, and no definite date can be set when work will be commenced. What will be done will depend largely on the success of agriculture and settlers' repayments under the divisions of the

project already settled or ready for settlement.

On these two projects the State of Wyoming has an area of 30,000 acres of desert land lying under works practically completed and more than 200,000 additional acres for which works have been partly constructed. To settle and properly develop these two projects will require the labor of 3,000 families and an investment of \$15,000,000 to \$25,000,000 of new capital for the improvement and equipment of farms alone.

The annual production, if the land is cultivated as irrigation requires, will approximate \$6,000,000, and the increase in value of the State's resources will exceed \$50,000,000. The engineering features of this great development present no insurmountable obstacles. It is the social and economic problems which remain to be solved. Construction should therefore be deferred until a program has been adopted under which settlers can be secured and given a real opportunity.

NO AUTHORITY FOR AIDED AND DIRECT- ED SETTLEMENT

If we open these lands to settlement under the present reclamation law, we will have no authority to advance money to help improve and equip farms, nor to clear and level the land, build houses or fences, in advance of settlement. The reclamation law was greatly improved in certain particulars by the last Congress, but it does not provide help for settlers in the difficult and unremunerative work of changing raw land into cultivated fields.

It was the unanimous opinion of five boards which last summer considered the settlement conditions on new projects that unless conditions for settlers are made more attractive than they are under the existing law settlement and agricultural development will be so slow as to discredit every new development. Although they did not agree fully as to what should be done to attract settlers and promote development, they all recommended radical changes from anything that is possible under the law in its present form.

PROPOSED SETTLEMENT PLAN FOR WILLWOOD

A report on conditions at Willwood and a settlement plan were prepared last year by George C. Kreutzer, who has had experience both in Australia and America, Andrew Weiss, for many years in charge of the North Platte project, and L. H. Mitchell, now in charge of the Shoshone project. All these men have for years had a personal familiarity with conditions in Wyoming.

The committee recommended that settlers be carefully selected in accordance

with their experience, capital, and other desirable and necessary characteristics, the selection of the settlers to be made by a board composed in part of citizens of Wyoming.

That provision be made for homes for farm laborers in tracts of approximately 5 acres each, grouped at convenient locations where employment is most likely to be had.

That a competent irrigation adviser should be provided by the Bureau of Reclamation whose duties would include:

(a) Preparing and seeding crops on unsold land.

(b) Corresponding with and assisting in obtaining suitable settlers.

(c) Assisting settlers in making selection of farms to meet their needs; in locating suitable cows, horses, and other livestock; in their building plans, farmstead layouts, tools, and equipment; and in working out financial and agricultural programs.

(d) Helping them form cooperative associations and in transferring their holdings, in case of failure, to new settlers.

That a fund of \$500,000 be provided to be used in making advances to settlers to assist in completing the development of their farms and equipping them with livestock and tools. Such advances should not exceed 60 per cent of the value of such improvements or livestock and should be secured by a first lien, the settlers to provide the 40 per cent. The advances should bear 4 per cent interest and be advanced for 3 years to not exceeding 20 years; repayments to be amortized half yearly.

That a set of 10 suitable house plans, several barn plans, and several typical farmstead layout plans be provided.

That means be provided to secure stock and domestic water for each farm (well water at Willwood is unfit for use), the cost of providing such stock and domestic water supply to be added to the construction cost.

That the Chicago, Burlington & Quincy Railroad and the Great Western Sugar Co. be apprised of the fact that a spur line is needed to open this area to beet growing.

That land speculation be prevented by suitable laws and regulations. No farm should be sold, sublet, or assigned without the permission of this bureau, all arrears to the Government to be paid before the sale is approved. If profit is made in such transactions, at least one-half the profit derived by the vendor should be applied to the construction charges.

If all these things are done, the settlers will still have to work hard, live on plain food, wear patched clothes, and have

many hardships and disappointments. But if these things are provided, if the State and Federal Government work with the settlers, we may expect a large percentage of those who make the attempt to develop and buy farms will succeed.

FEDERAL OR STATE AID TO SETTLERS NECESSARY

This committee believes that if the things it recommends are provided qualified settlers will be attracted and that the money advanced and the construction costs of canals will be paid. Such a settlement program can not be carried out unless the State or the Bureau of Reclamation is given authority and money to act. Senator Kendrick and Congressman Winter, of Wyoming, attempted to secure legislation last winter. They introduced bills which would enable the bureau to help in farm development and required the settler to have not less than \$1,500 capital and farm experience. Provision was made for a farm adviser who would be at the settler's elbow to help bring about teamwork between settlers in getting material needed for their improvements at wholesale prices through community orders and to work out cultivation and marketing programs. Advances up to \$3,000 for a farm were provided, the settler to put up \$40 against each \$60 advanced from the reclamation fund. The settler's own money would in this way underwrite the advance, and as the land belonged to the United States the Government would be doubly secured, since the improvement would increase the value of its land.

It seems to be a sound, common-sense, businesslike plan, but it was opposed by those who did not realize how hard it will be to secure settlers on projects where water rights will cost from \$100 to \$150 an acre and by those who object to taking money out of the reclamation fund to help develop farms, believing this fund should be kept entirely for construction. I believe a better understanding of what has happened on old projects will change this. We had better spend a little more money and make one project a success than build two failures. If this measure is not to be adopted, then we must have some other.

Another plan considered by Congress is to make settlement and farm development a State matter. On three projects this year's appropriations are conditional on the States entering into contracts with the Interior Department under which the State will subdivide the land, find the settlers, and advance money needed to improve farms. Under this plan we would have to advance not less than \$1,000,000 for farm development of land about ready for settlement at Willwood and Riverton.

(Continued on page 104)

WYOMING'S IRRIGATION RESOURCES

(Continued from page 103)

Without aid in farm development none of the projects built under war prices is feasible. Settlers with money enough of their own to change this raw land into farms will not come.

That is not all; leaving settlement and agriculture to shape themselves was a mistake that has cost the reclamation fund millions of dollars and will cost more. It has created financial conditions on older projects that can be cured only by refunding settlers' private debts or getting a new body of settlers. This is not conjecture; it is a fact. On the Garland and Frannie divisions of the Shoshone project settlers were accepted without any inquiry into their fitness and were given neither advice nor aid. What is the result? They have undergone a crucifixion; about 200 farms have been abandoned. Many have lost their homes through foreclosure. Payments are not made to the Government. Settlers are in arrears on construction payments \$336,000, and on operation costs \$251,000. Out of 70,000 acres in these two divisions only 38,000 are irrigated. Of the 838 farms now being cultivated 412, or nearly half, are cultivated by tenants.

Similar conditions exist on the North Platte project, which is partly in Wyoming and partly in Nebraska. The ultimate cost is estimated to be \$19,626,000, of which \$16,650,000 has already been spent. The project includes the Pathfinder Reservoir and the Interstate, Northport, and Fort Laramie divisions. Repayment comes from sales of stored water under the Warren Act and from payments made by settlers under the three divisions.

Here, as at Shoshone, farm development has been slow. More than 60,000 acres for which water has been provided are still uncultivated. Here also tenancy destroys the desirable social purposes of the act. Of 2,019 farms on the project 1,021 are cultivated by tenants and 998 by owners or managers. We have a condition of tenancy worse than in the older sections of the country.

The financial results are equally disturbing. Out of \$3,042,000 construction charges due the Government \$1,276,000 are unpaid. Out of \$1,939,000 operation and maintenance costs \$473,000 remains unpaid. Water sold under Warren Act contracts should be paid for like coal or any other commodity, but out of \$627,000 due on these contracts \$175,000 is unpaid. When settlers are pressed to pay, they present statistics of private debts, of mortgage foreclosures, and others impending which render it evident that the

percentage of tenancy is certain to be increased if some refunding and settlement program is not adopted here.

DIFFICULTIES OF THE SETTLERS NOT UNDERSTOOD

Those not familiar with the distressing conditions on the older projects say settle the new ones as the old ones were settled. They would not say this if they had gone through the grueling experiences of project superintendents.

They would not say it if they knew our anxieties over the condition of those settlers and the prospects of saving the Government's investment in works.

Nearly all this trouble has its origin in accepting unfit settlers and leaving the good ones to struggle unaided against obstacles too great for them to overcome. In May I wrote to the authorities of a district, not in Wyoming, where no payments on operation expenses are being made, to say that this could not continue. Their reply is that half the land is not cultivated at all, one-fifth cultivated by renters who are poor farmers, and that the cultivators living on their land are dead broke and in debt.

They say that the land is good, that the canals are well built, that valuable crops could be grown, but that under the kind of farming now practiced the average value of crops is less than \$15 an acre. The further statement is made that "The Government contributed in bringing to pass the present situation. It caused the project to get off on the wrong foot by

accepting too large a proportion of men who did not know farming and did not intend to become farmers. Business and professional men, clerks, school-teachers, and tradesmen in this vicinity at one time owned irrigated farms, so that in the collapse of values following the war the market could not absorb the offerings. In addition to this genteel class the project received a horde of discontented workers whose experience would fit them for anything but irrigation agriculture. The negligible repayments of the past few years can be traced to the kind of people placed on the land.

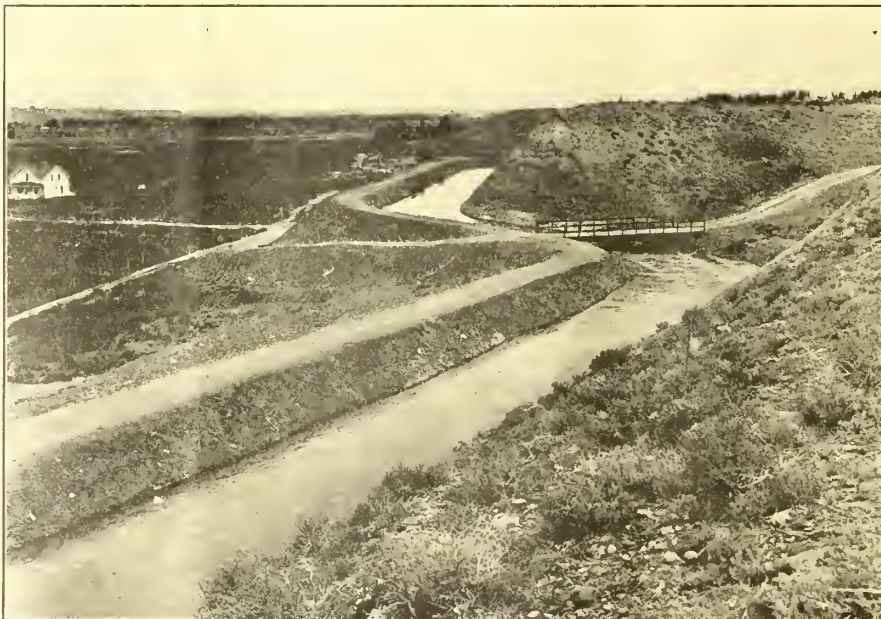
It would relieve the Bureau of Reclamation of an arduous and trying responsibility if the States would take charge of settlement and farm development. Whoever does it will have a difficult task because they will be in touch with people engaged in hard and trying work under new and strange conditions and helping them to keep up their courage and cut down expenses.

But we are faced by one of two alternatives. We should either assume this burden or quit building canals.

The main purpose of irrigation is to furnish the requisite amount of moisture to cropped soil.

A large concern of the farmer should be in lessening the waste of water in his supply ditch and on his farm.

One of the most common sources of loss of water in irrigation is poor preparation of the surface of the land being irrigated.



The South Canal on the Uucomphagre project, Colo

RIO GRANDE EMBARGO LIFTED BY SECRETARY'S ORDER

Based on fact that the purpose of the original withdrawals has been accomplished, that the Secretary has no power to suspend laws of Congress, and that granting of water rights is vested in the States

AN embargo preventing the granting of rights for the use of public lands along the Rio Grande in New Mexico and Colorado for the storage and diversion of water, made in 1896 by the then Secretary of the Interior, was lifted on May 20, 1925, by order of the Secretary of the Interior.

The original purpose of the embargo was to prevent the building of dams, canals, and other irrigation works on Government lands along the river, pending settlement of water rights with Mexico and construction of the Rio Grande reclamation project.

A portion of the memorandum accompanying the order follows:

The matter of the embargo or refusal to approve applications for rights of way for reservoirs and canals on the Rio Grande was recently brought to issue by the application for the Vega Sylvester Reservoir, a proposed irrigation project in the State of Colorado. On thorough consideration of that application and a finding by the Bureau of Reclamation that its approval would not interfere with the rights of the United States or water users under or in connection with the Rio Grande reclamation project, approval of the right of way was given. Protests against this action have occasioned a thorough review of the entire situation, which is found to be as follows:

(1) The claims of the Republic of Mexico to the use of the waters of the Rio Grande for irrigation purposes have been ascertained, protected, and provided for by convention, by acts of Congress, and by the construction of the Elephant Butte Dam and Reservoir near Engle, N. Mex., with a storage capacity of more than 40 times the maximum amount of water to which Mexico is entitled under the treaty. In the absence of accident or such unusual condition as is provided for in article 2 of the treaty, there seems to be no physical possibility of the Mexican rights being affected in any way by any action hereafter taken. As above set out, conditions of unusual drought or arising from accident are provided for in article 2 of the treaty. Therefore the suspension of applications for rights of way over public lands of the United States or refusal to grant same because of Mexican claims is clearly no longer warranted or required.

(2) The Rio Grande reclamation project, consisting of an immense storage dam across the Rio Grande near Engle, N. Mex., with appurtenant canals or other necessary structures, has been built and

water has been and is being furnished in satisfaction of Mexican treaty rights; also for the irrigation of lands, under the reclamation act, in the State of New Mexico and the State of Texas. I am advised that water is now being furnished or is held available for all the lands in the original project. The water rights of the Rio Grande project acquired, as provided in section 8 of the reclamation act, by appropriation in conformity with the laws of the States and carried into beneficial use by the construction of the storage and diversion works and by the application of the water to lands for purposes of reclamation and irrigation, have been accomplished and the rights thus vested and secured. The continuance of the embargo or order of suspension against granting of rights of way across public lands on the upper Rio Grande is therefore not required for the protection of the Government reclamation project. In fact, the purpose of the said order of withdrawal has long since been accomplished.

(3) The Rio Grande within the limits of New Mexico (and Colorado) is not a navigable stream. Therefore, the granting of rights of way over public lands along the upper Rio Grande does not affect any navigable stream within the limits of the States of Colorado and New Mexico.

(4) As a matter of fact, the approval of right of way for the Vega Sylvester Reservoir or future approval of rights of way for other reservoirs or canals on the upper Rio Grande can in no way defeat or diminish the water rights of any appropriator of water from the Rio Grande or its tributaries. A grant under the act of March 3, 1891 (26 Stat. 1095), does not create, grant, or establish a water right. It merely authorizes a corporation, association, or individuals to build on the public land a dam, reservoir, canal, or ditch to store or transport water, the right to use which must be acquired under the laws of the State.

(5) Appropriations of water must be made under State laws, and the control of the flow and the use of water is vested in the several States. Relative rights of appropriators and water users are determinable only under the laws of the States. This has been the uniform ruling of the department for more than 17 years. Consequently the withdrawal order or embargo merely precluded citizens from using and occupying unappropriated pub-

lic lands for their dams, reservoirs, or canals, but did not and could not affect their legal rights to appropriate water under the laws of their States. As a matter of fact, during the period of the embargo a large number of applications have been so made and the water stored and used through structures constructed over privately owned lands.

(6) Under the laws of the States of Colorado and New Mexico the use of water is governed by the doctrine of appropriation, followed by putting the waters so appropriated to beneficial use. As between two appropriators, other things being equal, priority controls. This method of determination is not confined to State lines, but applies to all States through which the river flows. In other words, in the case of a stream like the Rio Grande, traversing two States, priority of appropriation, followed by beneficial use, gives priority over subsequent appropriators and water users in either State. See case of *Wyoming v. Colorado* (259 U. S. 419).

(7) While the claims of Mexico and the fact that those claims were receiving executive and legislative consideration in connection with the treaty later adopted and proclaimed may have warranted a suspension of the granting of rights of way through public lands at that time, I am satisfied, now that all questions directly or indirectly connected with that situation have been settled and protected, that there is no warrant at this time for the Secretary of the Interior to suspend or obstruct the operation of the law of Congress of March 3, 1891, in its operation over the unreserved public domain in the States of Colorado and New Mexico. That act specifically granted a right of way through the public land for structures for irrigation, and where all conditions of the act are met by an applicant leaves no discretion in the head of the department as to its operation. It is the duty of the executive officers to carry into effect and administer laws passed by Congress, and I know of no authority in the Secretary of the Interior to suspend or defeat the operation of any such law. Neither can I find any warrant for refusing citizens who have made appropriations in compliance with the laws of their States of waters therein the right to use or traverse unreserved public lands of the United States in utilizing waters so appropriated.

(8) It is urged that the withdrawal or embargo should be kept in force until

(Continued on page 106)

DRAINAGE AND WATER RENTAL CHARGES, BOISE PROJECT

Letter to Superintendent Bond from the commissioner points out that the showings made for the necessity for extension in time of payment are entirely inadequate, and applications are accordingly rejected

A FIRM stand against granting of indiscriminate blanket relief to settlers able to pay on Federal reclamation projects by the repeated deferment of charges due the Government has been taken by the Commissioner of Reclamation with the sanction of the Secretary of the Interior.

The commissioner's action resulted from applications by 392 water users of the Boise reclamation project in Idaho for extension of time covering water rental and drainage charges, which were presented after irrigation began and after relief from payment of irrigation charges amounting to more than \$1,000,000 had been granted. Not only were these applications for a postponement of charges denied on the ground that the showing of inability to pay was inadequate, but in a letter to the superintendent of the Boise project, the commissioner discussed the general situation applicable to all the Federal projects with regard to deferred payments. The letter follows:

There are certain important features relating to extension of time for payment of uncollected water right charges applicable to all projects. These I wish to discuss in passing upon the 229 applications received with your letters of May 22, 23, 26, and 27 relating to drainage and water rental charges against lands outside of the limits of the Nampa and Meridian irrigation district and 163 applications by owners of lands within the limit

of the district, received with your letters of May 27 and 29.

Under date of April 18 the Secretary of the Interior directed that water be delivered for 60 days from that date to give landowners an opportunity to apply for relief.

Prior to this the department had on April 3 authorized extension to the Nampa and Meridian district for the payment of drainage charges, payments to be made monthly at the rate of \$7,000 until the entire amount of \$40,050.54 plus interest has been liquidated; and substantially similar terms were tendered the water users outside of the district limits on April 6, payments to be made monthly so that the entire amount due would be absorbed by the end of the present irrigation season.

Applications received almost invariably request extension to March 1, 1927, and in many cases they cover water rental charges. It has never been the intention of this bureau to recommend or of the department to grant extension on drainage and rental charges for the length of time stated or at all as to the latter charges.

The applications cover small amounts, the majority of them being for sums aggregating less than \$100. This is not one year's payments but often covers charges for the years 1921, 1922, 1923, and a portion of 1924. In many cases no payments have been made since 1920. Some applications cover amounts as low as \$7.50,

which we are asked to distribute over a period of three years. Authority has been heretofore granted to extend these charges so that payment may be made in five monthly installments, which in the case of the application just mentioned would mean that payments of \$1.50 monthly would be required. In the majority of the cases the payments to be made would amount to not more than \$25 monthly.

The showings made of the necessity for extension are entirely inadequate. It is difficult to believe that the returns from irrigated agriculture in this section have been so small that it has been impossible for water users during the last three or four years to pay the charges mentioned or that they can not now pay them when given an opportunity for payment in monthly installments.

All applications are accordingly rejected, and you are directed to advise the water users that payments must be made either wholly on or before July 1, or in five monthly installments, the first of which must be paid on or before July 1 next. You are directed to withhold the delivery of water unless and until payments are made as here stated.

These applications for extensions were not presented until after the opening of the irrigation season, leaving little time for inspection and report, and I take it that this is the reason why they were forwarded without any comment from you regarding the agricultural status of each applicant. I am not unmindful of the large amount of work which a personal investigation and report by you would have involved, but in all future cases of this character it is highly desirable that every application be accompanied by a report based on a personal investigation of yourself or one of your assistants. You will at once realize it is difficult for this office to pass upon these applications solely upon the paper record presented, which in many cases is incomplete and unsatisfactory.

When relief was granted last year for extension in the payment of other charges aggregating approximately \$1,120,000, it was assumed that no further relief would be required or requested. The additional and belated demand for extension of drainage and water-rental charges therefore came as a great surprise.

I believe it not out of place in this connection to comment upon the general

RIO GRANDE EMBARGO LIFTED

(Continued from page 105)

after the commissioners of the States of Colorado, New Mexico, and Texas have opportunity to consider the question of a compact relating to the waters of the Rio Grande and possibly reach a basis upon which the States named could agree upon a division of the waters. As already pointed out, the act of March 3, 1891, and grants made thereunder convey no water, but simply the right to occupy and use public lands, and the maintenance or revocation of the order of suspension of 1907 can have no real bearing upon the action of the commission or the settlement between the States involved of the water question, the latter being one wholly within their jurisdiction and to be determined irrespective of the right of way act of 1891 or

any action which the Interior Department may take in connection therewith.

It has been suggested that a hearing be held at which all who desire may appear and submit their views, but the facts are of record and could not be changed by argument. No legal rights of any nation, State, association, or individual to water appropriated and used under State law will be defeated or changed by the action proposed. There appears, therefore, no reason for subjecting anyone to the expense of attendance upon such a hearing.

Therefore, in view of the foregoing, it is believed that the so-called order of withdrawal or embargo should be revoked, effective immediately, and the laws of Congress and of the States permitted to operate.

situation with regard to payments. The relief act of May 9, 1924, and the so-called fact finders' law, approved December 5, 1924, are designed to give relief only in those cases where it is really needed. These acts are not designed to facilitate and encourage the evasion or postponement of legitimate charges the payment of which is within the financial ability of the water users. This fundamental fact unfortunately appears to have been ignored by many. The evidence is not wanting to support the conviction that many water users have refused to make payments in any case regardless of financial ability, believing that under the act of December 5, 1924, all back charges will be funded and a three-year moratorium will be granted in every case, even though not urgently needed, merely because the law affords authority for such action. They have therefore deliberately shaped their action to the end that there may be accumulated and remain outstanding when contract is made under the new law all charges possible, so that they may take advantage of the maximum benefit authorized by the law.

Whatever may be the causes for postponement of payments, it has created a situation on this and other projects that menaces the good repute of reclamation and its continuation as a governmental policy. A recent investigation of the Government projects in Idaho has caused an inspector to submit to this department the following statement showing the rapid and disturbing growth of indebtedness. Unless this can be checked, it is inevitable that Congress will be reluctant to pass appropriations for new projects or that the country will indorse such appropriations and projects. Hence it becomes a matter not only of individual duty but of State interest and pride to make considerable sacrifice, if necessary, to see that the contracts made with the Government for the repayment of costs on this project are regarded and stand upon the same basis as other contractual obligations.

These figures attest the trend. Further comment as to the need for calling a halt in this postponement of payments and cumulating indebtedness is unnecessary. It might be mentioned that until there is a better showing in the way of repayments than has been made since 1920 it will be difficult to justify the construction of new projects, whose failure will be foredoomed if the representations now made and the record of the old projects in Idaho are to be taken as a fair criterion, the more so because water charges on the new projects will greatly exceed those on the old ones.



A home in the orchard district of Yakima Valley, Washington

Status of uncollected water-charges with percentage of uncollected accruals on March 31, 1924, on the Boise project

CONSTRUCTION

Year	Accruals	Uncollected	Per cent
1917.....	\$190,496.33	\$4.96	-----
1918.....	283,838.04	4.96	-----
1919.....	206,203.32	142.83	0.7
1920.....	208,520.33	12,262.77	5.9
1921.....	410,271.07	80,439.57	19.6
1922.....	421,821.59	129,456.14	30.7
1923.....	668,158.31	507,505.11	75.9
1924.....	692,491.56	575,593.04	83.1
Total.....	3,081,800.55	1,305,409.38	42.4

OPERATION AND MAINTENANCE

1918.....	\$217,428.88	\$143.13	-----
1919.....	277,066.66	253.39	0.1
1920.....	370,115.60	29,998.93	8.1
1921.....	348,336.20	62,905.93	18.1
1922.....	283,284.89	80,025.16	28.2
1923.....	246,911.27	157,744.34	63.9
1924.....	161,468.16	130,752.82	80.2
Total.....	1,904,611.66	461,823.70	24.2

DRAINAGE

1921.....	\$133,595.12	\$5,469.26	4.1
1922.....	139,197.31	11,586.08	8.3
1923.....	138,641.43	83,692.52	60.4
1924.....	138,100.65	104,427.86	75.6
Total.....	549,534.31	205,175.72	37.3

SUMMARY

Total uncollected charges, construction.....	\$1,305,409.38
Total uncollected charges, operation and maintenance.....	461,823.70
Total uncollected charges, drainage.....	205,175.72
Grand total uncollected.....	1,972,408.80

The statements made in this letter are to be construed as passing at this time

only upon the matter of postponement of drainage and water-rental charges. The statements made are not to be taken as indicating action which may be taken upon reports made or to be made by the board of survey and adjustments. These reports will be taken up and consideration given to them at a later date, when such action will be taken as the conditions shown seem to warrant.

This general explanation is made in the belief that it is necessary and in the hope that a different attitude may be engendered on the part of some water users who possibly have not considered fully the aspects here discussed.

The matters discussed in this letter being of general interest, you are directed, in addition to giving personal notice to each applicant, to give this letter to the press in order that those outside the area concerned may understand the relation that solvency in old projects bears to future development.

Construction of a canning factory has been commenced at Wilder, on the Boise project, Idaho. This factory will employ 100 persons during three months each year. The output this year is estimated at 50,000 cases of corn and 20,000 cases of tomatoes. Later it is probable that considerable fruit and berries will be canned, thus extending the working season and providing a market for small fruits.

TUNNEL NO. 3 CONSTRUCTED ON NORTH PLATTE PROJECT

Tunnel more than a mile long, begun June 28, 1923, and holed through April 8, 1924, to carry water from the Fort Laramie Canal to the Gering Valley, described by J. K. Rohrer, resident engineer

A HIGH brule clay ridge between the Mitchell and Gering Valleys, ending abruptly at Scotts Bluff, made it necessary to construct a tunnel to carry water into the latter valley from the Fort Laramie Canal. Three tunnel sites were available, requiring a tunnel 3,300 feet long in the easterly site 4 miles west of Gering, a tunnel 5,800 feet long 8 miles south and 2 miles east of Mitchell, and a tunnel 6,500 feet long at the most westerly site 8 miles south and 1 mile east of Mitchell.

The canal was located to the most easterly site on the north side of the ridge and back to the south end of the most westerly site on the south side of the ridge. A comparison of the cost of the complete system, using the several sites, was made, and it seemed advisable to use the longer tunnel at a higher cost to avoid carrying the main canal through 8 miles of bad lands crossed by a number of dry ravines 30 to 60 feet deep.

Plans and specifications were prepared in the Denver office. The plan called for a horseshoe section tunnel 10 feet 3 inches high and 6,500 feet long lined with a 10-inch concrete lining and 336 feet of reinforced concrete-lined canal at the upper portal and 536 feet at the lower portal. The contractor was to furnish everything except cement and steel. Bids were opened at Mitchell, April 16, 1923. Four bids were received. The contract was awarded to R. S. Morrow & Son, Omaha, Nebr., the low bidder. The contract was signed on May 12, 1923, and on May 15 the superintendent for the contractor arrived and began the preliminary work.

The approaches to the tunnel are 40 feet deep in clay loam and had been previously excavated by Government drag lines. The tunnel at the north portal is in earth for 1,390 feet and at the south portal 1,100 feet. It was necessary to timber the tunnel throughout. In the earth section five-piece frames of 6 by 8 inch timbers with vertical posts, 6 by 6 inch longitudinal sills, and 6 by 8 inch cross sills were used.

Tunnel No. 3, North Platte project

Item	Unit	Quantity	Cost to United States
CONTRACTOR			
Excavation type A.	Linear feet.	4,011	\$86,236.50
Excavation type B.	do.	2,490	64,740.00
Excavation and trimming for approaches and lining.	Cubic yards	2,242	2,242.00
Permanent timbering.	M feet b. m.	447.062	23,247.22
Concrete in tunnel, portals, and transition.	Cubic yards	7,888.38	108,465.22
Concrete canal lining.	do.	336.84	4,378.92
Placing reinforced steel.	Pounds.	23,370	584.25
Backfill.	Cubic yards	257	257.00
UNITED STATES			290,151.11
Material.			35,118.51
Engineering.			10,500.00
General expense.			16,800.00
Total United States cost.			352,569.62

In brule clay seven-piece frames were used with sloping posts and no cross sills. The frames were spaced 4 feet center to center in earth and 8 feet in clay. The frames in earth were com-

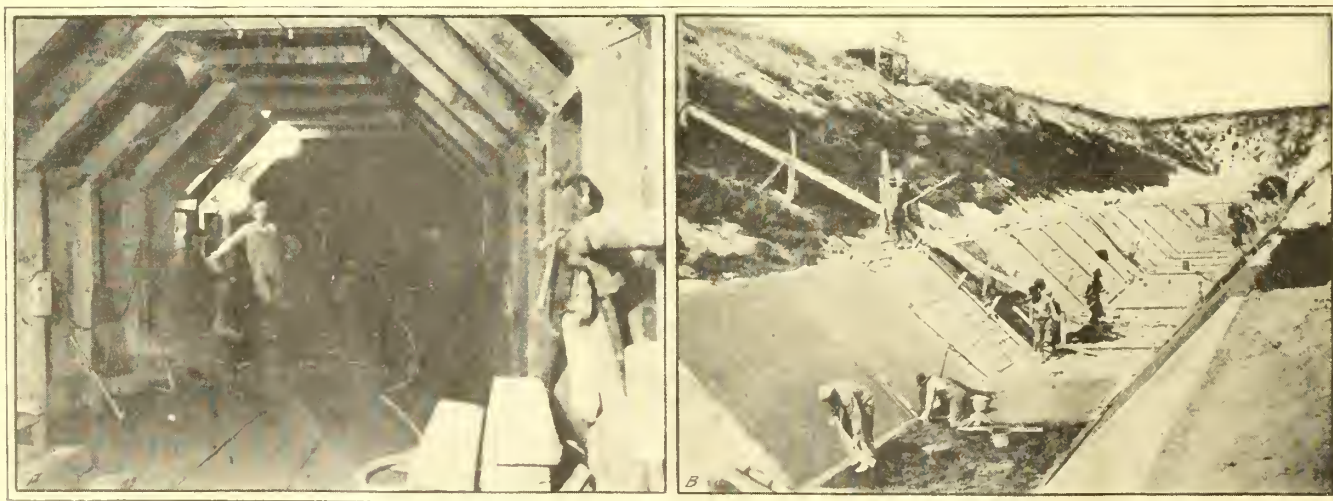
pletely lagged with 3-inch lagging, and in the brule clay an average of halfway down to the spring line.

Work was begun on June 28, 1923, driving the bore from both ends with two shifts a day. The bore was excavated to full section to the level of the bottom at the sides. Excavation was made 4 feet ahead of the timber in the earth section and the frame set in place and lagged. The material was loaded into ears on the track by hand, hauled to the portal by mules and pulled up an incline, shelved on the open cut to the dump with a hoist. When brule clay was reached and blasting became necessary, a shovel loader driven by air from a compressor on top near the portal was used to load the ears. Work was discontinued at the south portal and three shifts a day worked at the north portal until the heading was driven 3,050 feet, when the machinery was installed at the south portal. The bore was holed through on April 8, 1924.

The drilling for the blasting was done with coal augers run by air-driven breast drills.

The breast in brule clay was excavated about 50 feet ahead of the timber.

Ventilation during driving was obtained by a 30-inch blower driven by a small electric motor exhausting the gas from near the breast through a 6-inch pipe line through either one of the test pits dug by the Government or one of the well holes drilled on the center line of the tunnel by the contractor for this purpose.



A. South portal heading of tunnel No. 3. B. Paving south portal outlet

REPORT ON PROPOSED PROJECTS

At 800 feet from the north portal some water was encountered and there was a small amount all the way to 1,000 feet from the south portal. The total flow amounted to 20 gallons per minute. This water was pumped to the surface through a well hole and during concreting was used for the concrete. After the bore was holed through, work was begun trimming the floor for concreting. One side of the floor was excavated to subgrade and poured, the track shifted onto that side, and the other side excavated and poured. The floor was poured all the way through except a gap 800 feet long where the main supply of water came in. The water table was near the floor and it was thought the concreting of the floor might diminish the supply below what was needed for concreting the barrel. Wood forms were used in concreting the barrel. The forms were built in 12-foot sections. The ribs carrying lagging to the spring line were set in place and wired and braced to the tunnel timbers. The form was filled to the spring line, a section of lagging put in on each side and that filled. The lagging for the top or keyway was in 4-foot sections. The top was usually poured 24 hours after the sides. The surface was given a face on a radial line so as not to weaken the arch. Ninety-six feet of forms were set at one setting. The forms were removed five days after the top was poured. Two shifts a day concreted and one shift set forms. The concrete mixer was located in the bottom of a draw 40 feet deep at 1,400 feet from the north portal. The materials came from stock piles on the level ground near the draw by gravity to the mixer. The cement came down a chute from the cement house and the water came from storage tanks on the edge of the draw. The mixer discharged through a shaft into the tunnel directly into cars. The concrete was hauled through the tunnel with a Fordson tractor mounted on a locomotive traction frame and fitted with special gears to give the same speeds in either direction. In filling the forms the cars were run up an incline onto a platform on trucks inside the forms. The cars were dumped and the concrete shoveled in by hand.

The concrete in the canal lining in the approaches was mixed with a small mixer set on the top of the open cut, chuted into the bottom, and shoveled into place.

The tunnel was lighted with electricity. Power for light and for the motors on the hoist, air compressor, and blower was obtained from the Government high-tension line that passed directly over the tunnel.

The costs and quantities of the complete structure are given in the accompanying table.

AN interesting addition to the relatively meager literature on the subject has recently been made by the Department of the Interior through the publication of a report on the agricultural and economic feasibility of seven proposed irrigation projects in the States of Washington, Oregon, Nevada, Utah, and Wyoming.

The report was prepared under the direction of the Commissioner of the Bureau of Reclamation by men familiar with the economics of irrigated agriculture and irrigation engineering and was reviewed by a separate local committee for each project, composed of bankers, business men, and farmers.

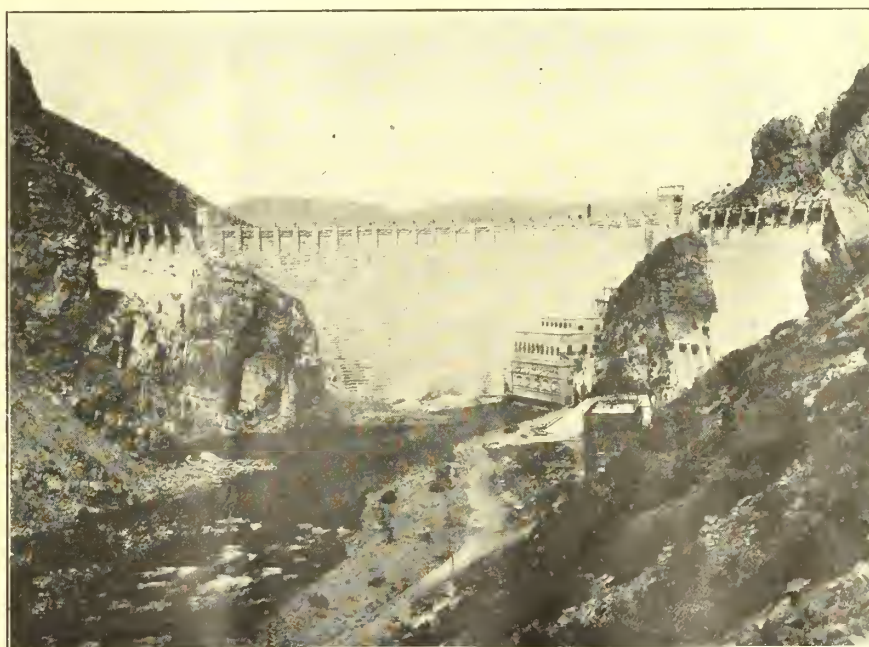
The various committees dealt with the size of farm units to meet the needs of settlers with varying capital and labor in the family, the cost of clearing the land of brush and leveling it, and the cost of equipping the farm with buildings, machinery, and livestock. This was done to determine the amount of capital, together with credit available, a settler would have to possess to take one of these farms and successfully develop it. For the projects investigated a settler should have available capital ranging from \$4,000 to \$7,500. The average settler now seeking land possesses a small automobile, from \$1,000 to \$2,500 in cash, and perhaps enough furniture to

furnish a modest home. Only about 10 per cent of prospective settlers have a capital amounting to more than \$2,500.

Data were gathered on the amount of State and county taxes generally assessed, and an estimate made of the increase in taxes needed to provide additional schools, roads, and other civic improvements. To this were added other fixed charges, such as repayment of bond issues, existing or contemplated, estimated water charges, insurance, and interest on borrowed money. These fixed charges, plus operation and living expenses, were weighed against estimated incomes. Due consideration was given to the period of time that must elapse and the capital that must be invested before a farm could be made a going concern.

Markets and transportation were studied. The amounts of mortgages prevalent in the district were considered and the rates of interest and terms of repayment of both long and short time loans.

The conclusions of the local committees of business men and farmers who reviewed the reports in general coincided with the views of the men who made the investigations. This was especially gratifying, and added materially to the value of the reports, as these local committees were familiar with marketing conditions, selling prices of products, and freight rates in their respective localities.



Roosevelt dam, Salt River project, Ariz., showing Taintor gates

SETTLEMENT PLAN INDORSED

THE settlement plan published in the June issue of the NEW RECLAMATION ERA is commented upon as follows by one of the most effective colonization agents in the employ of one of the transcontinental railroads serving a number of the irrigation projects of the bureau:

"I fully agree with Mr. Kreutzer's ideas as in part they are in line with what we have advocated for a long time. We take the position that communities must cooperate in the settlement of their vacant lands with the railroad and maintain that their interest is as great as ours; consequently they should share in the responsibility of bringing about farm-land settlement. To such communities we say that we will go with them on a 50-50 basis, but only with the understanding that the lands to be offered must be selected by a competent committee,

prices must be reasonable, deferred payments extending over a period of years, and when the new settler does arrive it is somebody's business to interest himself to see that he is properly taken care of and given some service in getting started right.

"We usually work through the chambers of commerce, who are responsive, and the fact that they take the lead in the community inspires confidence in the mind of the prospect, as he realizes he is not dealing with a real-estate agent, at least to begin with. Some of these chambers of commerce have a list of all lands that have been passed on, which are submitted to the prospect making inquiry or making personal call, and if interested they can call upon any local real-estate firm who has the same listings and in no case can a greater price be charged than the option calls for, and in case of sale the real-

estate man collects 5 per cent commission from the owner.

"The chamber of commerce can not take it upon itself to actually sell land, but they will see that the prospect is fairly treated and if then given the right kind of service we minimize failures to some extent. The new settler should be guarded against overbuying, and in the event of purchase of dairy cattle he should again be protected, not only as to prices but to see that all cows have been properly tested.

"To get anywhere at all in farm-land colonization, we can no longer proceed on the old time 'slipshod' methods, which is simply to sell land, take the profit, and let the settler work out his own salvation as best he could. We find colonization becoming more difficult as we go along; people are harder to move, there are fewer of them, and unless the proposition is unusually attractive and we are prepared to give the prospective settler real constructive service and protect him, so far as we can, not only against fraud but also excessive interest charges and other costs, we can not hope to make any progress."

EVAPORATION AFTER IRRIGATION

THE direct evaporation of water from the ground surface may account for 10 to 40 per cent of the water applied, as pointed out in Bulletin No. 101 of the Agricultural Experiment Station of Arizona. This loss is much larger on heavy loams and adobe soil than on sandy soil. It is greatest, of course, during and just after each irrigation and decreases gradually until the next irrigation. In the case of alfalfa it is comparatively high after each cutting and decreases as the plants grow again and shade the ground. It is greater on an open, wind-swept area than on one protected by windbreaks.

Many methods for reducing the evaporation loss are available to the farmer. They are as follows:

1. *Deep plowing.*—A shallow seed bed underlain by packed soil tends to cause a high evaporation loss. From 7 to 9 inches of soil should be turned over by the plow.

2. *Cultivation.*—In the case of crops planted in rows, such as corn, the ground between the rows should be cultivated as soon as possible after each irrigation. In the case of orchards the ground should be furrowed just before irrigating and cultivated soon afterwards. If the furrows are 6 inches or more in depth one may expect to save a considerable percentage of

the loss which would occur without the mulch. Even alfalfa needs cultivation at least twice a year, and particularly after the soil has been packed by winter pasturing.

3. *Increase in soil fertility.*—It is difficult to make a mulch when humus is lacking. A fertile soil takes water readily, and if mulched on top retains it with comparatively little loss by evaporation. Straw should be spread on the ground and plowed in. Weeds, trash, and green manure crops can be utilized to improve the fertility. All stable manure should be spread and plowed into the soil.

4. *More thorough and less frequent irrigation.*—This practice, besides saving water, tends to establish deep root feeding, whereas frequent light irrigations encourage shallow roots. For alfalfa one irrigation per cutting is ample except for sandy soils, where two lighter irrigations are usually necessary.

5. *Irrigation at the right time.*—Irrigate heavily before planting and withhold water after the planting for a considerable time. In the case of alfalfa irrigate about a week before cutting. This will supply the water when it is most demanded for plant growth, and after cutting, the ground being still moist, the new crop will spring up quickly and shade the ground. Wheat should be planted in thoroughly

irrigated ground, and with the aid of good winter rains no irrigation is needed until the boot or flower stage. Cotton should be irrigated sparingly in the early stages of growth.

6. *Irrigation at night.*—Evaporation is much restricted in the night as compared with the day time. It is a great mistake to shut down pumping plants each evening.

7. *Elimination of weeds.*—The waste of water to raise weeds should be included with evaporation losses. Weed farming is unprofitable.

8. *Windbreaks.*—They should be planted along the roadsides. Every farmer should raise his own fence posts and firewood. Wind movement in the Salt River Valley is greatly reduced by the long rows of trees with which the landscape is checkered. The near-by fringes of fields require additional fertilization, but the net result of windbreaks is beneficial.

A dairy barn doesn't need to be costly to be clean.

You must like cows if you expect them to make a profit for you. Then you have got to study and understand them and all that goes with their breeding, feeding, and care.

A livestock sermon in six words: Better sires, better stock, better success.

DOMINICAN REPUBLIC COLONIZATION

THE budget of the Dominican Republic for the year 1925 includes an appropriation of \$250,000 for irrigation projects and \$50,000 for the colonization of the irrigated areas, both sums to be expended under the administration of the Department of Agriculture and Immigration of the National Government.

The following is from a statement commenting on the above, prepared by the Department of Agriculture and Immigration:

A real necessity exists for the irrigation of a large part of our arid lands. By so doing we may place the majority of our rural population in a position to produce constantly and methodically without being dependent upon the rainfall, which has been very irregular during the last 10 years.

Only by irrigation and facilities for colonization, grouping people together in limited areas where school instruction can be furnished their sons, may we prepare them for a less difficult life, less charged with penalties, and beneficial to the country and to themselves.

Colonization will permit us to give direct objective instruction to each farmer by means of competent agricultural instructors given the facilities of convenient demonstration areas and able to direct the preparation of the land, the planting and harvesting, and finally the preparation of the product for the market.

It will facilitate the measures to increase production, particularly when such increase is based upon changes in the crops to be raised and in methods of cultivation.

It will facilitate the education of the children of this generation, who must be the agriculturists of the future, training them for better production, making them better citizens, and capable of conserving our country.

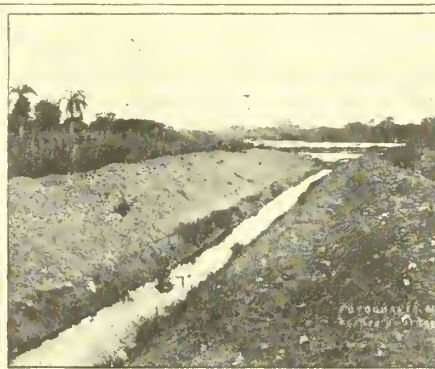
It will permit us to establish cooperative associations to assist farmers and gather together and classify products in large quantities, thereby increasing their market value and enabling us to compete successfully with other countries at present better organized than ourselves.

These colonies will be established in proportion to the carrying out of these irrigation projects, choosing for each the land offering the best facilities for preparation and the greatest assurance of satisfactory results from the work of the colonists.

Each colony must be established, organized, and regulated in its work before proceeding with the establishment of others, always excepting unforeseen circumstances which might counsel a different attitude by the Secretary of Agriculture and Immigration.

Each organization or colony must be based upon the establishment of a school, police protection, and a technical director of agricultural work. Cooperative associations should be formed and in a manner to permit efficient supervision of production.

The cooperative associations will be charged with the duty of selecting seeds and distributing them to the farmers as loans. The agricultural instructors will select the seeds which shall be used for planting to best advantage and available ground; and in order to stimulate production, every effort shall be made to obtain for the producer the best price offered for either domestic consumption or exportation.



Irrigation canals in the Dominican Republic

COLORADO TON-LITTER CONTEST

THE plan of the Colorado ton-litter contest in 1925 is to encourage farmers to produce a litter of pigs the aggregate weight of which shall equal or exceed 2,000 pounds in six months. The contest is being conducted on a county unit basis; that is, the farmers compete within the county and the several counties in turn compete for State prizes.

The objects of the contest are (1) to demonstrate the commercial value of better sires, (2) to demonstrate methods

of feeding for cheap and efficient production, (3) to demonstrate the value of saving a larger percentage of pigs at farrowing time, and (4) to arouse greater interest in hog production in Colorado.

Cash and other prizes will be awarded by the local county organization, the Denver Chamber of Commerce, the Denver Union Stockyards Co., the Colorado Bankers Association, and Mr. W. N. W. Blayney, of Denver.

A number of entries have been made by farmers on the Uncompahgre project.

H. A. Ireland, associate agriculturist on the project, has furnished the following additional information concerning this contest:

"We have secured more than the required number of entries in both counties so that the contest is assured.

"We are especially emphasizing the care of the sow for the sake of saving the maximum number of pigs as a means of realizing a greater net return per sow, and hope by keeping feeding records of these litters to demonstrate that there is a profit in quick finish of pigs for market."

Reports on weights and the eligibility of litters to an award are to be certified by the county committee and forwarded to the State committee not later than November 10, 1925.



Strawberry Valley project lands viewed from the High Line Canal

LAND DEVELOPMENT POLICY IN ITALY

The following is from an article in a recent issue of the *International Review of Agricultural Economics*, discussing the agrarian policy in Italy:

"Under a comprehensive betterment scheme, the land becomes, as it were, an object on which human constructive skill is exercised through a series of modifications and developments. The work of transformation is in part undertaken by the State, under the form of the more important and striking works of public utility, including the regulation and utilization of water courses, and in part by

private individuals in the form of farm buildings, plantations soil improvements, etc., the whole being coordinated under a single general plan by which the original area, hitherto uncultivated or abandoned, and malarial, is adapted, restored to healthy conditions, and practically reconstructed by human effort, so that it becomes not merely an area of intensive cultivation, but one whereon the higher forms of social life may flourish.

"Those public works which are an essential prerequisite will no longer be carried out independently and without due regard to the proposed changes in the systems of cultivation; they will be brought into close relation, and the one regarded as the essential outcome, the mathematical 'function' of the other."

ORLAND DELINQUENTS ARE URGED TO PAY UP

That the Orland project is determined to maintain its enviable record of meeting its payments to the Government is shown by a recent letter, addressed by the Orland Water Users' Association to "those shareholders who have not yet made remittance for the 1924 operation and maintenance charge."

Pointing out that "Congress and the Budget Bureau will lend a more sympathetic ear to our request for additional funds if this charge for an adverse year like 1924 has been met," the association urges these water users "to invoke every resource at your command for making prompt remittance for the unpaid operation and maintenance charge."

COMMISSIONER MEETS SOUTHERN GOVERNORS

On May 28 Commissioner Mead held a conference in Washington with Governor McLean, of North Carolina, Hugh McRae, of Wilmington, N. C., and others on matters relating to investigations of settlement problems with a view to presenting a definite policy to the Bureau of the Budget in accordance with the legislation of December, 1924, authorizing an appropriation of \$100,000 for the investigation of how arid and semiarid, swamp, and cut-over lands may best be developed.

On June 2 the commissioner attended a similar conference in Columbia, S. C., with Governor McLeod and others interested in the State's settlement and development program.

COLONIZATION BY FRENCH IN ALGERIA

In a recent publication concerning the new regulations for the colonization of Algeria by French settlers, by Bernard Augustin, the fact is stressed that it is useless to give land to persons who have not the means to bring it under cultivation. "Before the war applicants for free grants of land in Algeria were required to possess a sum of 10,000 francs; to-day 25,000 francs are required, and a much stricter inquiry is made into qualifications than was formerly the case. A minimum expenditure of 40,000 to 50,000 francs is now indispensable for bringing an allotment of land under cultivation.



Wheat field, two years in cultivation, on the Minidoka project, Idaho

NEW RECLAMATION ERA

VOL. 16

AUGUST, 1925

NO. 8



TIETON DAM, YAKIMA PROJECT, WASHINGTON
Dedicated July 2, 1925

PEOPLE, like animals, are found in greatest numbers where food is easiest to obtain. They, too, are gregarious. Our rapidly growing population and citizenship must be provided for in advance. We should locate its necessities and conserve that which can not be reproduced. It is said that 38,000,000 acres more will be needed for crops in 1955, with no increase in our imports, to feed the normal increased population.

Our reclamation projects, which are of engrossing concern to me, have 6,609 unoccupied farms of varying size, or 564,000 acres—more than 14,000 potential farms of 40 acres each. How we can put farmers on this land who will produce foodstuffs in lieu of what we are importing is our big problem.

The United States last year imported about \$425,000,000 worth of crude foodstuffs and food animals, exclusive of wool and cotton. It is idle to change our production of farm products and limit them to compel higher prices until we are producing more than we consume.

*HUBERT WORK,
Secretary of the Interior.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

AUGUST, 1925

No. 8

NEW METHODS MUST BE APPLIED TO NEW CONDITIONS

Formerly the Government gave nothing and exacted little. To-day the Government gives land and advances millions without interest, but expects the principal to be returned on installments

Speech by the Secretary of the Interior, at Great Falls, Mont., June 26, 1925

CONGRESS in appropriating money for completing the Sun River project made it a partnership development. The conditions of this appropriation require the Bureau of Reclamation to build the reservoir and complete the canals; afterwards the State of Montana to subdivide the 40,000 additional acres that will be reclaimed, find the settlers, advise them, and advance money to equip their farms. Before we begin there should be a complete understanding regarding this development, and I have invited the governor to go over the project with me so that together we can study conditions, form some idea of the possibilities, and then determine whether the plan outlined by Congress ought to be adopted, or, if it is not satisfactory, agree on what recommendation should be made to Congress, construction to be postponed until there can be further legislation.

It is not necessary, however, to inspect the Sun River project to know that changes are needed in the settlement clauses of the reclamation act if development is to go on in the Rocky Mountain States. The conditions in practically all the northern tier of States show that under the act Federal reclamation has not produced the desired agricultural results. It has not given the industrious, experienced settler the kind of an opportunity he should have. It has given too wide a range to land speculation. It has bred the menace of tenancy.

Instead of the settlers on these projects having a sense of gratitude to the Government for what it has done for them, the letters and petitions which come to the Department, and the statements which appear in the press show that disappointment and bitterness prevail to an extent.

We ought not to go on with a policy that creates these results. The question is, What can we wisely and safely under-

take to improve these conditions? Solvency in future development requires that we do something. I have no fixed theories to impress on you; I want the use of your minds and experience. It is your problem primarily and I am offering the weight of the department to help solve it. There has already been spent on the four projects of this State, for construction, \$16,000,000. Of that only \$628,000 has been repaid, and on four important divisions not one dollar of construction costs has been returned. It has cost to operate these projects \$2,876,500. Of this only \$926,300 has been collected. All the money that has been received would not repay the Government what it has expended in operation and maintenance. An irrigation work that is not worth enough to pay for its operation should not be continued.

Acting on this conviction, we are arranging to sell the Williston project, and we have to seriously consider whether the same action should not be taken with regard to the Lower Yellowstone project, where, out of \$968,000 operating costs to December 31, 1924, only \$174,000 have been repaid, the deficit to-day standing at \$794,000.

FINANCIAL OUTLOOK GOOD FOR FARMERS

Good financial prospects for farmers this year are predicted by the United States Department of Agriculture in a recent report on the agricultural situation, in which the statement is made that "given strengthening livestock markets and fair feed crops, plus fair returns from wheat and cotton, farmers will come out of 1925 better than they have in most of the years since 1919."

These results are not believed to be due to lack of agricultural resources. They are the result of too large holdings, lack of belief in the necessity for irrigation, poor cultivation, inflation in the prices of privately owned land, and the lack of capital and equipment needed by settlers to enable them to cultivate their land as irrigation requires.

We believe that the time has come when we must place more emphasis on the problems of farm development. It is a new idea in this country, because for so many years we had free, fertile land to give away; but with project costs continually increasing and costing more than developed farms in some older sections of the country we must now begin to think of what is needed to develop earning power and to speed up settlement and farm development which measure earning power.

We want to hear no objection to financial aid in the improvement and equipment of farms, assuming that it will be conservatively and wisely administered. The objection that it is paternalistic applies with greater force to aid in building canals, and especially where the land under those is held in large tracts by private owners. If we can develop a system by which the money advanced for farm improvement is to pay interest and be used to improve land that belongs to the Government, and the expenditure watched by practical business men, it would seem a common-sense business like policy. Where it has been tried it has given results that suggest its trial on this project.

Speaking broadly, with the whole country in mind, something must be devised quickly that will check the flow of farmers to the cities to become day laborers. We can never inaugurate a back-to-the-farm movement, but have

(Continued on page 114)

MANY AGENCIES ENLISTED FOR DEVELOPMENT OF WEST

No man builds houses to rent unless there are renters, and Congress will not open up new farms unless there are prospective farmers who will live on them

(Continued from page 113)

hopes that a stay on the farm may be made more attractive.

In considering new projects we must remember that thousands of farm areas under Federal irrigating ditches have never been farmed; other thousands have been abandoned; that about a half million farms in the United States were abandoned last year; that railways that once were our best aid for settling the West can not now carry people who will not ride, and they are not interested in peopling land with those who can not produce any freight for them to haul. We have for months been trying to interest the immigration agents of the different western railroads in securing settlers for our projects. We have urged high officials to meet with us to discuss the problems of reclamation on the ground. They are enlisted with us for the common purpose of developing the West. We are in the position of having something to sell to Congress, and we must be able to show Congress that we have men enough in sight or coming to work these projects, or it will not advance money to develop them. No man builds houses to rent unless there are renters, and Congress will not open up new farms unless there are prospective farmers who will live on them.

Farming when the original 13 States were settled, and for a long time afterwards, was regarded only as a mode of living. If a farmer could clear his land of timber, raise his family and school them neighborlike, he was regarded as a good citizen and a successful man. He had no help from his neighbors; he was not disposed to return it in kind, in raising a barn, rolling logs to burn on a clearing or perhaps a husking bee, unless sickness overtook him; then all would volunteer to keep up his seasonal work.

The Government did nothing for him except give him land at nominal cost and levied taxes. Although very low, they were then harder to pay than now, because money was rarely seen.

Each family then lived within itself. Their cellars and barns were filled during the summer for the winter's consumption. Industry and thrift were then instilled and ingrained in the youth.

Now our complicated manner of living, an outgrowth of our evolving civilization, has transformed farming and its methods into a science and realization of its profits into a business.

Farmers expect to make money from farming after the actual daily necessities of living have been met, and they must do so to live by the same standards set by the villagers whom they support. The most timely and important institutions of learning to-day are the land-grant or agricultural colleges fostered by the Government since 1862. I have wondered why they provide such a diversity of teaching, from swine breeding to voice culture, when they are supported by sale of land, and agronomy is the most vital science in this world to-day. But I am told that culture is necessary to good homes, and it is, but much of it bears no relation to farming and culture and training of the mind may be had from practical instruction, useful in making a living from the soil.

To-day and particularly on irrigated lands we must apply new methods for new conditions. Contrasted with the old practices, where the Government gave nothing and exacted little, are situations to-day where the Government gives land and advances millions without interest, but now expects the principal to be returned on installments.

The land the Government has offered has been for the most part fertile, cleared and ready for the plow. Returns from its utilization have been almost immediate, compared to the wresting of a few acres each year from the forests for crop growing. But the irrigation farmer was met with obstacles on many projects as hard to overcome as the forests were. He was often without the experience gained from farm life from childhood. He had to unlearn the shameful, blue sky propaganda, through which he was induced to locate on raw land liable to seepage, and some of it unproductive. He almost lost his faith in his Government because of the specious promises made by its representatives and local land agents, and often felt that reassessments were laid to cover estimate mistakes believing that since he had already located he would acquiesce in them rather than abandon his prospects for a farm home.

It is these unfortunate attitudes of mind and conditions we have set ourselves to change and correct. For six months six able men studied the Federal reclamation wreck for the Department of the Interior—the president of the National Farm Bureau, a former Secretary of the Interior, an eminent irrigation lawyer, a distinguished international student and

writer on irrigation, an engineer, a foremost citizen in an irrigation State and the present Commissioner of Reclamation, admittedly and at the same time a master sociologist, economist, reclamationist, and engineer. The term engineer in the Reclamation Service must be made to mean more than a dam builder or an engine driver. It must mean an efficient manager from now on, if reclamation is to succeed.

Two of these men are canvassing old projects to study and determine if it is impossible for settlers to pay the costs and charges assessed against them. Each project is being reviewed and a separate report will be made to the Department. We are making at this time a study of proposed new projects, their physical features, fertility, length of growing season, crops adapted, markets accessible, financial requirements of settlers, etc.; but my principal concern is to discover the attitude of the people locally—whether or not they believe a project to be feasible. For I must certify to the Congress on this point. Whether the land is being held for speculation, whether those living in town realize that the success of a proposed project is vital to them, whether the business men are disposed to exploit the new venture, to get the money appropriated by the Government immediately, or treat these new settlers as neighbors and community assets and not as voters to be cajoled or strangers to be preyed upon.

It is of vital moment to the future of Federal reclamation that we first reclaim reclamation, that we restore lost confidence in its Government representatives, reestablish the enthusiasm brought onto projects by settlers, and discredit those who live by farming the farmers.

Irrigation has done much toward opening up new countries. I believe in it and want to further it, but I am not willing to let Federal reclamation continue to ride recklessly to its own ruin without an effort to save it to those who by their courage and industry have earned the right to home ownership.

We are making this inspection of proposed new projects with the idea of building them and to get acquainted with the conditions on each one, particularly its people, for on their attitude will depend the ultimate results of the venture.

The total horsepower used annually on farms amounts to nearly 16,000,000,000 horsepower-hours.

THE FUTURE OF IRRIGATION DEVELOPMENT IN MONTANA

Better results for everybody will be had if the money needed to supplement settlers' capital, so that farms can be promptly and properly improved, is provided before construction is started

By the Commissioner, Bureau of Reclamation

THE mean value of the crops grown on irrigated land for the four projects in Montana for 1924 was \$24.77 an acre. That was an average, but on these projects there were farms where the value of crops raised was close to \$100 an acre. Some farms are used to grow alfalfa and sugar beets, with satisfactory results to the grower and to the Government; on the other hand, large areas are used to grow blue-joint hay or are not irrigated at all. It is those areas which bring down the crop averages.

There is no question that irrigation in Montana has suffered because it has rained enough to encourage people to neglect irrigation and depend on the clouds. This uncertainty has done much to delay development, because the land is being irrigated without being properly prepared and is used to grow crops of low acreage value because they will stand neglect and do not require the physical effort demanded in the cultivation of many of the more high-priced crops.

For the last year we have been making an economic study of these projects to find out what can be done to increase the value of crops, the number of people on the land, and the returns to the Government. The irrigation possibilities of the State are such that reclamation ought to be a success, but these possibilities will not be realized in the next 50 years if we follow a course of drift and inaction. We must deal with settlement and farm development as fundamental problems which need attention equal to that given the design and construction of new works. We must put an end to supplying water to people year after year without requiring them to pay for it. That only encourages delay in development and is an injustice to those settlers no better off who, year after year, have made sacrifices to meet their obligations to the Government.

Cooperation with the State, with the landowners in securing settlers and in farm development, must also be adopted as fundamental features of our policy. At a conference in Chicago last March we took it up with the colonization departments of all the western railroads, and through correspondence and conferences since the director of reclamation economics has been endeavoring to work out a settlement and farm development program for each of these projects.

RESULTS OF A RECENT INSPECTION

We hope and expect that in this movement we will have the active cooperation and support of the State. Some conclusions as to what is needed, reached by the director of reclamation economics on a recent inspection of these projects, will be given. Speaking of the Lower Yellowstone, he says:

This will be a very fertile field for settlement because the project costs are low and the type of soil is excellent. In addition to this, some of the farmers are intensively cultivating their land. They have about 8,000 acres of beets planted this year and 1,700 acres of canning peas for seed. The peas were up and looked fine. The fields had been carefully prepared and showed that knowledge and experience had been used in planting and caring for the crops. This was a great contrast to the Sun River and Milk River projects.

I was very agreeably impressed with the agriculture of this section. It is going to make a fine project, and we can safely encourage settlement from every angle. Their committee will soon interview landowners and tie up a large acreage for settlement.

That poor financial returns on Montana projects come from delayed farm development is shown by a study of conditions on the Milk River project. Speaking of this, the director states:

I met with the Glasgow Chamber of Commerce in the evening and found there a favorable atmosphere. The Great Northern has been very active in bringing in beet workers some of whom will no doubt become farmers in the future.

However, this whole project lacks an adequate and intensive agriculture and what can be accomplished on reasonably sized farms.

If we had 10,000 acres of the best land developed along the line of the Durham State settlement in California, I believe it would solve the problem. Now a new settler comes in and is surrounded by thousands of acres of "Blue joint" and will find very few neighbors interested in intensive agriculture.

In the Milk River Valley there are probably not more than 100 farms on which the expenditure for leveling, ditching, and diking has amounted to as much as \$15 or \$20 an acre. The remaining 500 farms vary from raw land to land only partially improved.

The average size of the farms is about 250 acres, although there are a number of 160-acre homesteads. On the other hand, about 120 men on the project own 45,000 acres of land, or an average of 375 acres.

About 88,000 acres under present constructed works are in private ownership, at least 50,000 acres of which are in need of settlement and would accommodate 300 families.

A study of economic conditions is being made on Sun River, because the last Congress appropriated \$500,000 for the construction of an additional storage reservoir. About \$4,500,000 has been spent for construction on this project. To complete it will require about \$5,000,000 more. Before entering on a work requiring so large a sum we ought to have a

(Continued on page 116)



A flock on every farm should be the slogan of the irrigation farmer

SUCCESSFUL DEVELOPMENT DEMANDS DEFINITE PROGRAM

Such a program of aided and directed settlement is new in the United States, but it is the central idea in irrigation development in other countries

(Continued from page 115)

definite program of development which contemplates not simply the building of canals but settling the land, improving the farms so that they are going concerns and able to support the families living on them, and helping them meet their payments to the Government.

About 100,000 acres of land will be brought under settlement on the Greenfields division of this project. This will require about 1,000 settlers. Carefully prepared estimates show that to improve and equip these farms for intense culture will cost on an average \$5,000 for each 80-acre farm. The settlement records of the bureau show that 70 per cent of the applicants who apply for land have less than \$2,000 capital and only 10 per cent have over \$2,500. If we are to base our plans on finding people with \$5,000 of their own, we will almost certainly fail. Development will be so slow that the Government will lose heavily and the settlers living on the project will have to pay burdensome construction costs.

A more sensible plan is to base our settlement program on securing settlers with from \$1,500 to \$3,000 capital, but if we do this we must provide a fund to be used in making advances to supplement the settlers' capital in the improvement of their farms. If the settlers who come to this development bring half of the money needed for farm improvement, they will bring to the State between two and three million dollars, and if we are to give them a real opportunity in inviting them to come here, we must provide from some other source between \$2,000,000 and \$3,000,000, to be used in advances for building houses and fences, leveling land, and helping settlers get their needed equipment.

A DEFINITE PROGRAM ESSENTIAL

Such a program is new in the United States, but it is the central idea in irrigation development in other countries. The need for such an agricultural program has been abundantly shown in the past history of the Sun River project. Although this land was reserved for irrigation and settlers knew that it was to be an irrigation project, when they came there was no definite farm program based on the kind of cultivation irrigation requires. Settlers began to farm much as they had in a country that depended on rain alone, and after the canal had been started and a large amount of money had been spent 75 settlers asked to be released from any

payments to the Government on the ground that irrigation was not necessary. This led to a curtailment of the construction plans. By 1923 all were convinced that dry farming was a failure and 185 landowners requested that a reservoir on Beaver Creek and the irrigation works as originally planned be built.

TWO PROBLEMS TO BE SOLVED

To make this a solvent enterprise two problems must be solved. One is the re-funding of the private debt of settlers now on the project so they can have more time. The other is to work out a program for the new development. Last year I talked with scores of settlers about their problems. I wanted to find out why payments due the Government were not being made. One settler who had borrowed \$5,000 to complete the improvement of his farm was paying 8 per cent interest; the mortgage was overdue; it could be foreclosed at any time. He had no heart to go on.

A settler at Milk River started without money to buy and improve a farm. He had teams and tools but no working capital. He expected to get along while growing a crop by having credit from the local grocer and from the man from whom the land had been purchased. He had planted part of his farm to beets, which require intense cultivation. The seed bed needs to be properly prepared. The crop needs to be thinned, cultivated, and watered at the right time and in the right way. He had arrived late. His beet field had not been properly leveled. It was needing both cultivation and water, but the men on whom he relied for credit could not keep their promises and he had been obliged to leave his farm and go to work for wages. Every day's labor on that beet field would have been worth three or four times what he could possibly earn in wages, but it was a choice between abandoning his crop and starvation. Many settlers were in the same condition, and the wonder was that we were getting any money.

We find many settlers now on the project are in serious financial difficulties. Private debts on the Greenfields division amount to over \$300,000, largely secured by mortgages on their farms or their personal property. This indebtedness and the payment of interest on it has prevented the proper improvement and equipment of farms and is one of the causes for the low acreage value of crops

and for the failure of settlers to meet payments to the Government.

Notwithstanding these unfavorable conditions the Secretary last year recommended that money be appropriated for completing the project, basing his action on the fact that a fine body of settlers are now on the area. They can not prosper with the canal in its present condition. With farms properly improved this project can be made a center for diversified farming, for fattening sheep and lambs, producing milk for butter and cheese making, and growing alfalfa, potatoes, and sugar beets. Large yields of grain can be secured in crop rotation. This is the kind of farming practiced around Greeley, Colo., where land is high priced and farmers are prosperous. Sugar beets are a profitable crop under irrigation in Montana. Three of the four Federal projects in this State have beet-sugar factories. Growing sugar beets makes good farmers; the crop compels it.

I talked with bankers at Greenfield. They are keenly interested in the welfare of settlers. One said, "The project needs sheep. If every farm had 50 sheep to eat up the surplus fodder, they would bring in enough money to pay the irrigation costs." He said, "If I had the money or the bank could spare it, I would advance to 100 settlers enough to buy 50 sheep for each farm, but the bank does not have the money. It has loaned all it can spare to the settlers on the project."

Recently there has been a gratifying awakening in Montana to the need for improvement of farms and extension of intensive cultivation. Vice President Gilman, of the Great Northern Railway, has taken a paternal interest in the Milk River project. He has spent money in getting options on large tracts of land. He has struggled with owners to get them to reduce the prices of this land and to give settlers better terms. He has spent his money and has passed around the hat to provide money to bring in farmers who would cultivate the land as tenants or buy on long-time contracts.

I admire what he is doing and will do all I can to help him succeed, but I have no confidence in a hand-to-mouth development of farms where millions of dollars are needed. Better results for everybody will be had if the money needed to supplement settlers' capital, so that farms can be promptly and properly improved, is provided before we start construction. I do not care whether the money comes from the State or the reclamation fund, so long as it is assured.

BUMPER CROPS ARE PREDICTED

AGRICULTURAL conditions on the projects at the close of June indicate that bumper crops, good prices, and widespread optimism among the farmers will be the outstanding features of this season.

Yuma project, Arizona-California.—The melon season was well advanced and prices were good, growers profiting by the poor crop in Imperial Valley. Shipments comprised 125 cars of watermelons and 129 cars of cantaloupes. Alfalfa seed was being harvested at 16 cents a pound. Four thousand five hundred pecan trees had been planted. A fair stand of cotton was in normal condition. All orchards on the Mesa were showing vigorous growth.

Orland project, California.—A fair second crop of alfalfa was harvested. All apricots had been picked and largely marketed at attractive prices of \$42.50 to \$43 a ton. Indications pointed to a light almond crop, although the nuts will be large and of good quality.

Grand Valley project, Colorado.—Harvesting of the first cutting of alfalfa, digging early potatoes, and cultivation and irrigation of sugar beets and other crops were in progress. Alfalfa produced a satisfactory yield. Potato growers were optimistic over the crop, the price of which ranged from \$2.10 to \$2.50 per hundredweight. The sugar factory reported that beets never looked better.

Uncompahgre project, Colorado.—Crops were in excellent condition and yields were expected to be higher than the average. The first cutting of alfalfa was heavier than normal. The price of wheat ranged from \$2.50 per hundredweight for soft to \$2.65 for hard. Onion buyers were offering contracts at \$1.50 to \$2 per hundredweight.

Boise project, Idaho.—The first cutting of alfalfa was in the stack and the second cutting was making a fine growth. Barley was being cut and promised good returns. The hay and grain crops were far above normal. Apple orchards were doing well.

King Hill project, Idaho.—All grain and corn was in excellent condition and it was expected that this will be the best grain year for the project in a number of years. The first cutting of alfalfa was a little short. A larger acreage than usual of the second crop will be used for seed. Shipping of potatoes is expected to begin shortly.

Minidoka project, Idaho.—All crops were in a healthy condition. Wheat made an excellent showing. The first cutting

of alfalfa had been harvested and the second growth was making good progress. New potatoes were being dug for local use, and peas, lettuce, onions, and other garden truck were available in abundance.

Hunley project, Montana.—General crop conditions were excellent. Alfalfa and small grains appeared to be the best in the history of the project. Sugar beets did not promise a very large yield.

Milk River project, Montana.—The first cutting of alfalfa produced a good yield. Thinning and weeding of beets were in progress. About 5,500 acres had been planted to this crop.

Sun River project, Montana.—Crops were in excellent condition. The first cutting of alfalfa started about the middle of the month, about 10 days earlier than usual. Early grain crops were beginning to fill. It was expected that the sugar-beet crop will prove profitable.

Lower Yellowstone project, Montana-North Dakota.—All crops were growing rapidly after a late start due to frost and dry weather. A heavy first cutting of alfalfa was nearly all in the stack. Peas, beets, cucumbers, and small grain were making excellent progress.

North Platte project, Nebraska-Wyoming.—Crop conditions were very favorable. Small grain, corn, and sugar beets were 10 days in advance of the ordinary season, and bumper crops were indicated. Favorable prospects for good prices resulted in a feeling of optimism among the farmers and business men. Many inquiries were received from Colorado feeders as to the availability of alfalfa hay for cattle and sheep feeding this winter.

Newlands project, Nevada.—Harvesting of the first crop of alfalfa was completed. Grain was in excellent condition and the yield was expected to be heavy. Cantaloupes and other truck were making good growth.

Carlsbad project, New Mexico.—Crops in general were in need of water, the sup-

SOUTHWEST BENEFITS FROM RECLAMATION

As indicative of the value of reclamation activities in the Southwest, a recent report covering 1924 crop statistics for the State of New Mexico shows that the average value per acre of crops for the State of New Mexico as a whole was \$28.30; whereas the two counties of Dona Ana and Eddy, which are included in the Carlsbad and Rio Grande projects, averaged \$77 and \$76, respectively.

ply of which was short. As a whole, however, the cotton crop was in fairly good condition. Alfalfa in most cases was being left for seed, but the prospects were not very good.

Rio Grande project, New Mexico-Texas.—Some of the more advanced fields of cotton were in bloom. Stands of cantaloupes were exceptionally good. A large number of carloads of cabbages and apples had been shipped and pear shipments were expected to begin shortly.

Umatilla project, Oregon.—The second crop of alfalfa made rapid growth and was about ready to cut at the end of the month. New potatoes, strawberries, raspberries, and early apples were being marketed. Gardens made good progress.

Klamath project, Oregon-California.—The first cutting of alfalfa began at the end of the month. Crops in general were in excellent condition and a large crop was expected from the Tule Lake leased lands.

Belle Fourche project, South Dakota.—Crops were in excellent condition and well advanced. Small grain promised bumper yields. The first cutting of alfalfa was about 80 per cent completed. Rain delayed haying operations and caused some damage. Exceptional yields of sugar beets were anticipated from some fields.

Strawberry Valley project, Utah.—The first cutting of alfalfa had been completed and cutting and threshing of the pea crop were in full swing. The sugar-beet crop was in excellent condition with prospects of being the best in years. Wheat and grain were doing well. The cherry crop was poor and the apple crop fair. In general the crop prospects were above the average.

Okanogan project, Washington.—The apple crop was not so large as that of last year, but was expected to bring good returns.

Yakima project, Washington.—Crops were in excellent condition. The first cutting of alfalfa had been harvested, a considerable shortage being reported owing to winterkilling. A heavy cherry crop had been marketed, phenomenal yields being reported in some instances. Excellent prices were received, 280 cars being shipped at an average value of \$3,500 a car. Prospects were encouraging for a good apple crop. A good crop of apricots and a fair crop of pears will be harvested.

Shoshone project, Wyoming.—Hail damaged the crops severely on the Frannie division, particularly alfalfa, sugar beets, and grain. Crop prospects were excellent on the Garland division. The first cutting of alfalfa was about 50 per cent completed. The acreage in wheat and seed peas showed considerable increase.

LAND PROBLEMS SUBJECT OF COOPERATIVE ARRANGEMENT

Contemplated work of the Division of Rural Institutions of the University of California and the Federal Land Bank of Berkeley described briefly by Charles H. West

TO economize by avoiding the duplication of effort, the University of California and the Federal land bank about two years ago entered into a cooperative agreement for the gathering of data useful to both institutions. For the university the reports and studies that have been made the past two years are to serve as a background for future studies in land problems and land settlement. The work has given a picture of general economic conditions and will give an inventory of the State's unimproved and partially improved lands. In order to understand the problems of the State, it is necessary first to become intimately acquainted with existing conditions.

Success in loaning money depends upon the knowledge one has of the security, upon the knowledge one has of the problems of the community in which the security is located, and upon the integrity of the individual to whom the loan is made.

When the farm loan act was passed, the land banks were confronted with more business than the banks could handle for several years to come. Unlike our other large loaning institutions, they had no vast accumulation of information regarding the territory to be served, no well-trained personnel for the particular work, and no close contact with the problems and spirit of the community they were to serve.

The first problem of the banks, therefore, was to become acquainted with conditions in the territory to be served as quickly as possible. It will be remembered that in California nearly every type of agriculture is represented—humid farming, intensive and extensive irrigation farming, and dry farming. In addition the development of irrigated lands has been carried on through various types of State-created district organizations. In California there are a number of irrigation, reclamation, levee, and drainage districts organized under State law. The economic conditions in each district is a problem by itself. The cost of the construction, its quality and serviceability, must be analyzed in terms of the development. If agricultural development is slow, the cost of construction and especially the cost of water falls heavily on the small area intensively farmed. The cost of irrigation service must therefore be considered with the bonded obligation, and in some instances, where the indebtedness is small, expense for water, particularly where pumping is necessary, is excessive.

So far the work that has been done has consisted chiefly in reviewing the irrigation construction and associating the cost resulting therefrom with a type of agriculture and the extent and rate of agricultural development within the area.

This work has pointed out the necessity for solving many problems as valuable to

the prospective farmer and to the large land owner or land company contemplating the subdivision of land as to the Federal land bank. It is hoped that when the present type of studies is completed the Federal land bank will desire the continuation of this work to solve these problems. The Federal land bank has had two engineers in its employ almost since its organization gathering irrigation engineering data relating to the four States served, and although they are now fairly well informed their staff of well-trained appraisers is not as able to solve these problems as the university. Those conducting this cooperative work of these two institutions are crystallizing methods for getting these problems solved.

It is believed that in various parts of the State where typical agricultural industries are centered a thorough study should be made of conditions to determine how many of the farmers are succeeding, how many are barely making ends meet, and how many are failing, and what are the things that have contributed to the success or to the failure of these people. If these microscopic analyses of the internal condition of certain communities were before us as a guide, we could more intelligently compare conditions that are found in the partly developed areas. It has been surprising to find in some of our well-established areas a vast amount of land that is not productive enough to meet the district and county taxes and pay the costs of farming.

Secondly, in the State we find a vast amount of new development. The capital that a farmer needs in order to undertake development of a farm depends on the type of farming that he is going to follow. Evidently more money is needed for developing a fruit farm than to develop a dairy farm, and likewise more money is needed to develop a dairy farm than to produce farm crops without livestock. More information should be available for beginners, so that they will know what generally is required of farmers undertaking the development of different types of farming in order to bring the land to a point where it will be self-supporting. To make this material other than theoretical paper computations, field work is needed to determine what generally are the losses sustained by the average farmer from poor leveling of land, from inability to utilize to full capacity all his land for several years while it is being developed, losses due to change in the



A portion of the High Line Canal on the Strawberry Valley project, Utah

type of farming begun, losses due to inability to market what is grown, incidental and contingent expenses heretofore guessed at, etc. It should be determined from actual practice what factors or assumptions should be used in our computations. We must determine what percentage of the theoretical computations should the farmer under specific instances be expected to accomplish. This knowledge is essential to the Federal land bank, because it involves the question of the amount of equity a farmer shall have in his property when a loan is granted. Evidently if the farmer has not enough capital to see him through, the loan ultimately will become delinquent.

Third, in the State we have a large inventory of land provided with irrigation and reclamation construction that is awaiting development. The prices of land vary radically. In certain sections it is known that the price of land is far beyond its earning power. If the farmer pays too much for his land, he is beaten before he begins. The land price is based principally upon three elements—the productive capacity of the land, its location with reference to transportation, highways, etc., and upon the social environment in the community. The price of land when development is beginning should be a little less than its productive capacity. By this is meant the ratio of the capital and labor put into the land to the gross income derived from the sale of the products. This is the efficiency of the land. Studies should be made in various parts of the State to determine accurately what this efficiency is, so that it would be a guide for the newcomer and a guide to the banks in loaning money. California lands are overcapitalized. Banks authorized to loan 50 per cent of the value of the land generally loan about 30 per cent of the current sale price. The settlers and newcomers to California do not realize this.

The Federal land bank is mapping its territory to indicate the maximum loans that will be made in each classified area. This mapping can not be done from a technical standpoint. It is based largely upon the experience of the bank and the practice of other loaning institutions. Statistics have been gathered to show what other banks have loaned in the past years in various parts of the State. It is hoped that technical field determination can be made to demonstrate the productive value of farm land and by considering the business cycle the average earning power may be determined based upon a number of years. While the solution of these problems is needed by the Federal land bank, it is just as badly needed by the land companies promoting the sale

SETTLEMENT ON RIO GRANDE PROJECT

AT THE end of the 1924 season there remained of the original Rio Grande project an area of approximately 30,000 acres susceptible of settlement and development. This area is composed of lands held by nonresidents or by local owners unable to finance the development cost.

Two organizations on the project, the Chamber of Commerce at Las Cruces and the Gateway Club of El Paso, have been very successful in attracting the proper character of settlers to the project lands.

The activities of the Gateway Club are particularly striking and noteworthy. This organization is financed by popular subscription from El Paso business men, and \$150,000 has been collected. This is being used in a campaign of national advertising and a follow-up system of correspondence. At the first of the year this

and subdivision of tracts of land and by the settlers taking up lands in California.

Beyond the scope of our work but related to the subject is a consideration of the economic condition of our various agricultural industries to know whether they are over or under developed—a thing that can only be worked out by associating statistics with a study of the condition of the producer. Land values are greatly influenced by over or under development of the industry in the country.

organization had received approximately 50,000 inquiries, to which activity may be attributed the bringing to the project of four or five hundred settlers.

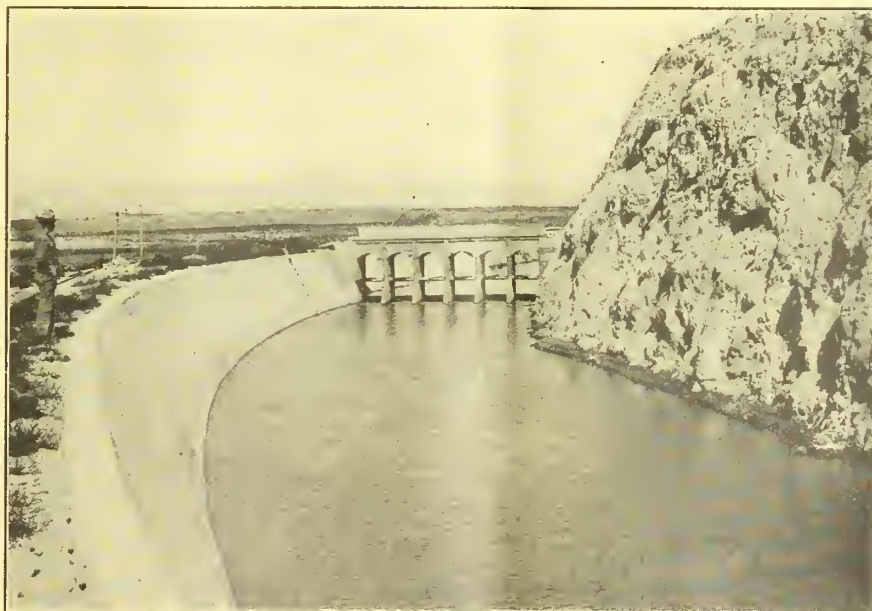
The work of the Las Cruces Chamber of Commerce is of the same character, with more restrictions as to available funds and scope of its work.

With the introduction of cotton growing and successful yields and results obtained there was a natural tendency to obtain lands on the Rio Grande project by settlers from other districts, particularly from districts not so favorably situated as regards water supply, drainage, climate, and soil conditions.

The project office has assisted in the preparation of advertising data and in having settlers referred to the Bureau of Reclamation office by the two settlement organizations mentioned for more details regarding the irrigation and drainage system and general farming practice.

The settlement of the project lands, considering the advantages which the project has to offer, is not a serious problem; and as it is now being cared for by the Chamber of Commerce and the Gateway Club there is no requirement for particular activity on the part of the Bureau of Reclamation.

The farmer with several sources of income is the one who is reaping the largest profits.



On the Interstate Canal, North Platte project, Nebraska-Wyoming

THE DESIGN AND CONSTRUCTION OF SMALL EARTH DAMS

A nontechnical discussion of small dams and embankments of a type usually required for small farm reservoirs, such as can be readily constructed without elaborate equipment

By W. H. Nalder, Engineer, Bureau of Reclamation

IRRIGATION farmers often find it necessary to construct reservoirs to store water, for irrigation or domestic and stock use, in order either to supplement the water regularly available from the company or Government ditch or to store such water for use between irrigation seasons or between periods of delivery from the ditches. Such reservoirs are naturally often provided by constructing an earth dam across the mouth of a small valley or other natural basin.

The construction of an earth dam of any considerable size or one that impounds any considerable volume of water should be done with great care. The investment is great, and the risk of losing this investment and the danger of imperiling the lives and property of others in the event of the failure of a dam should be carefully considered and amply guarded against. The various States have enacted laws placing the construction and maintenance of such dams under the supervision and control of the State engineer or other authorized official, and no person should proceed with the construction or use for the storage of water of any such structure, regardless of size, without first ascertaining that he is acting fully within the laws of the State.

Earth dams may vary in size from small canal banks to large reservoir dams, perhaps 200 feet or more in height. The

factors determining their individual design are numerous and are dependent upon such variable quantities as the nature of the foundation, the climate, the materials available, and the use to be made of the reservoir created. On account of these conditions the design and construction of earth dams often require the very highest type of engineering skill, experience, and judgment. This article, however, will be limited to the nontechnical discussion of the design and construction of small dams and embankments of a type usually required for small farm reservoirs such as can readily be constructed by teams, wagons, and scrapers and without more elaborate construction equipment. The following discussion should be considered only as outlining general methods and not as being applicable to all conditions.

THE FOUNDATION

The preparation of the foundation for an earth dam is of great importance. The most suitable material on which to place an earth dam is sandy or gravelly clay. However, for a farm reservoir it will generally be necessary to use whatever foundation is available and to take suitable precautions to prepare this foundation so that an economical and safe dam will result. The first thing to

be done is to remove from the entire area to be occupied by the dam all sod, brush, trees, roots, and other perishable matter and all soil to a depth equal to that penetrated by the roots. All this material should be wasted. If pockets of quicksand or clean sand are found in the foundation, these also should be removed, or special precautions taken to care for them under competent engineering advice. If the exposed material is sandy or gravelly clay of substantial depth, the embankment for small dams may be safely built directly upon it, but it should first be scored with a plow to provide a bond between the foundation and the embankment. If solid rock is encountered in the foundation, low concrete cut-off walls should be built parallel to the top of the dam. These cut-off walls should extend at least 12 inches into the solid rock and should rise above the rock surface from 2 to 4 feet according to the height of the dam. Parallel cut-offs should be built at intervals generally not exceeding 20 feet throughout the area of the foundation that consists of solid rock. If the foundation consists of open gravelly or sandy material that would be freely draining, an open cut-off trench should be excavated to the more impervious underlying material and this trench filled with impervious material and made a part of the impervious portion of the main dam. Earth dams should not be built on a shale or slate foundation. If running springs are encountered in the foundation, the site should be abandoned or competent engineering advice secured before proceeding further with the work.

THE EMBANKMENT

The arrangement of the material in the embankment and the method of placing and compacting it will depend upon the relative quantities and kinds of material and the available moving equipment. If sandy or gravelly clay in abundant quantities is available and the height of the embankment to be built is not over 50 feet, the material may be deposited uniformly over the embankment. The material may be transported and handled with teams and scrapers or dump wagons. The material should be deposited in horizontal layers not over 1 foot thick and the travel over the embankment in placing the material should be so distributed as to secure as thorough and uni-



Irrigation by means of a small flume

form a compacting effect as practicable. If this compacting does not produce a firm and solid embankment at all points, further compacting may be obtained by sprinkling with water and rolling with a steam or horse-drawn roller. Most farm tractors make good rollers for this purpose, or one can be made by placing an axle through several cast-iron car wheels and rigging a tongue to it so that it may be drawn by teams back and forth over the embankment. The corrugating effect of the flanges of the car wheels is especially effective in compacting moist earth. An economical corrugated roller can also be made by filling with concrete a section of corrugated metal culvert pipe about 3 feet in diameter.

It is quite often the case that the amount of sandy or gravelly clay or other available material that will form an impervious embankment is limited and insufficient to build the entire embankment. In such cases it is necessary to use this material to the best advantage and to supplement it with other material that is available in order to make a safe, stable, and water-tight dam. Under such circumstances it is often best to place the best water-tight material in a puddled core in the body of the embankment by sluicing or ponding methods, but it is not recommended that this be done except under skilled engineering supervision. For small embankments satisfactory results, under these circumstances, can usually be obtained by placing the selected water-tight material in the upstream portion of the dam and by constructing the downstream portion of heavy, stable, freely draining material, such as sand, gravel, and stone. Such material should be so distributed that the coarser material is on the downstream slope of the dam, changing gradually to the finer and more claylike material as the impervious material in the upstream portion of the dam is reached. The material should be placed and compacted in a manner similar to that described for homogeneous embankments, but where heavy gravel or rock fragments are used the compacting operations may be omitted. No general rule can be laid down as to the amount of impervious material that it is necessary to use in a dam. For the type of embankment contemplated in this description the thickness of the impervious portion should be not less than one-third to one-half the horizontal thickness of the dam at any elevation.

THE DAM'S DIMENSIONS

The proper dimensions for an earth dam depend upon a number of factors. The top width should be sufficient to form a substantial structure and generally should

be wide enough to provide a suitable roadway for crossing from one side of the canyon to the other and for making repairs to maintain the dam and related structures. A top width of 8 feet is suggested as a minimum for small dikes. For dams over 20 feet in maximum height this should be increased up to about 20 feet for dams 50 feet or greater in height. The top of the dam should be sufficiently high above the highest water surface in the reservoir to obviate all possibility of the dam being overtopped even by spray or splashing during high winds. For the very smallest reservoirs the height above high water should not be less than 2 feet and for most ordinary circumstances not less than 5 feet. For reservoirs of any considerable size and for all dams 50 feet or more in height this height should be not less than 8 to 10 feet. The minimum upstream and downstream slopes of the dam are fixed in some States by statutes. The downstream slope should be sufficiently flat to avoid weathering. For the type of dams contemplated in this article this slope should never be steeper than $1\frac{1}{2}$ horizontal to 1 vertical, even for the smallest dams, and in general should not be steeper than 2 horizontal to 1 vertical. The upstream slope should in general be flatter than the downstream slope and in general should not be steeper than 3 horizontal to 1 vertical. Unless the upstream slope is protected by some suitable pavement such as hand-placed riprap or heavy rock facing it will usually be impracticable to maintain a slope as steep as 3 horizontal to 1 vertical.

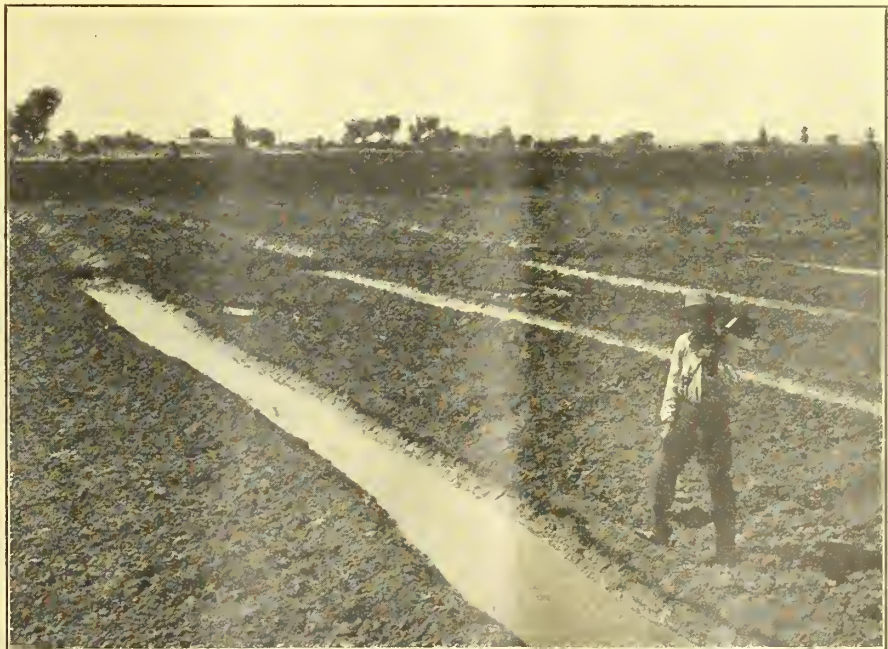
THE SPILLWAY

Often the most important feature of an earth dam is the spillway. No earth dam should be constructed without ample provision for the safe passage of the maximum flood that can occur with the reservoir full and without encroaching dangerously upon the freeboard of the dam. Spillways for earth dams should in general not be controlled by gates that must be operated by an attendant, but should be automatic. The detail design of spillways is affected by many considerations and each spillway must be adapted to the conditions existing at the site.

THE OUTLET WORKS

Every reservoir formed by an earth dam must be provided with suitable outlet works to provide for drawing off the stored water as required and for controlling the discharge from the reservoir. It is most desirable to have the outlet works independent of and apart from the dam, but for the type of earth dam contemplated, it is usually necessary to construct this outlet through its base or at best in a tunnel through one abutment. The main consideration in outlet works for earth dams is to make them safe from danger to the dam structure. The pipe or other conduit laid through the base of an earth dam should be amply strong to withstand cracking or fracture under the heavy load of earth fill placed upon it. The controlling gate should be placed at

(Continued on page 122)



Irrigating a cantaloupe field in the Mesilla Valley, Rio Grande project, New Mex.-Tex.

TOWN PLANNING A RURAL NEED

IN the United States nearly 20,000,000 people, or about one-fifth of the population, live in villages. These tens of thousands of villages are also the service stations of more than 30,000,000 farming people, for the purposes of business, education, religion, health, and social well-being. Thus the lives of almost half of our population are intimately affected by village conditions. These people, classed as 'rural' by the census, produce practically all of our food supply, send leaders into nearly all walks of life, and are the chief conservators of our national ideals.

"The approaches, arrangement, sanitation, and attractiveness of these villages, upon which a sound and healthy economic and social country life depends, are of vital importance to the half of our population living in the villages or using them throughout a lifetime. Villages should be easy of access; approaches should be direct, durable, and enjoyable. Physical layouts should be based on naturalness, healthfulness, and convenience; housing conditions should be sanitary, convenient, and economical; dwellings should be satisfactory to the eye and set in pleasant surroundings. There should be clean and well-kept lawns, tree-bordered streets, and good architecture. Dump heaps and congested places should give way to open

spaces; and public parks and playgrounds, lake shores, spots of natural beauty, and points of historic interest should be set aside for the use and enjoyment of all. Public buildings should be so located and arranged as to facilitate business efficiency and stimulate civic pride.

"Not all villages can have all these improvements at once, but they can overcome self-satisfaction and plan specifically for the betterment of conditions. The sooner these changes are planned the more easily they will be realized, year by year, even though only one improvement at a time can be made. The plan can be drawn before the village is started, taking into account existing natural conditions and allowing for necessary changes in the future. If the plan is flexible and the goal is always kept in view, the village may easily direct its growth and development, thus avoiding the necessity of making itself over later under great difficulties and at great expense.

"The day of isolation has passed. No longer can villages afford to be ugly and unknown. Modern methods of transportation and communication have opened up the hidden places. Millions of tourists travel thousands of miles annually over improved highways. European villages have long realized the economic value of the tourist traffic and have prepared to take advantage of it. They have found that beauty pays, and discovered

the inefficiency of the commonplace and the efficacy of individuality and physical distinction in towns as well as in people.

"Village planning, whether original or continuous, is not merely a theoretical idea. It is the foresighted application of ordinary business methods in the making of public and private improvements, so that physical development will go hand in hand with social and industrial progress. It is not just a new way of spending money. It is the application of good business principles to the necessary spending of money; the spending of a little to-day that a much greater amount may be saved later. In truth it is real conservation of public property and genuine economy of public funds.

"In the different instances of village planning which follow, some are of definite, initial planning relatively well adhered to in later years; some are a combination of deliberate planning and spontaneous natural development; some are of villages largely replanned at considerable expense and trouble because of undirected early growth; and some are of villages doing one notable thing at a time all directed toward the general future well-being. In all the human element is uppermost. Group action predominates. Social well-being always results whether it is the direct objective or the consequence of primary economic aims."

Farmers' Bulletin No. 1441 gives instances of what has been done in numerous towns in many States, and indicates the importance of such planning and the facility with which valuable results may be attained.

SMALL EARTH DAMS

(Continued from page 121)

or near the upstream face of the dam to avoid the possibility of introducing water under pressure into the body of the dam. Ample cut-off collars should be provided to prevent percolation of the water along the outside surface of the outlet conduit, and great care should be taken in compacting the earth fill around this conduit. The water should be discharged at the outfall end in such a manner as to avoid all danger therefrom to the downstream toe of the dam.

ENGINEERING SUPERVISION

On the whole it is believed that there is no structure usually connected with irrigation works that is so subject to varying local conditions and that requires the exercise of more care and mature judgment, to the end that economical and safe construction may be obtained, than earth dams. It is therefore believed that no such dam should be built except under the advice and supervision of a competent and experienced engineer.



A section of the orchard region on the Okanogan project, Washington

THE TIETON DAM AND RECLAMATION

The Secretary of the Interior dedicated the Tieton Dam on the Yakima project, Washington, on July 2. The following is from an editorial on that date in the Yakima Herald:

The celebration to-day at Rimrock is a historic event of much importance to this valley. The dedication ceremonies to be held at noon mark the completion of one of the largest dams in the world and the largest earth-filled dam. The significant fact about the occasion, however, is that the building of the Tieton Dam anticipates the further development of this fertile valley. The storage waters at Rimrock, together with the normal run-off of the stream, will be sufficient to irrigate 100,000 acres of land in addition to the 348,000 now under irrigation.

We have demonstrated here in this valley that reclamation has not been a failure. The results already obtained justify the opening up of the other four units of the Yakima project to settlers. This project stands out as one of the two most successful projects which have been undertaken by the Government. The gross production on the Yakima project during the last 10 years has amounted to over \$90,650,000, or approximately three-fifths of the total cost to the Federal Government of irrigation construction. All who view the fertile fields, the hundreds of prosperous homes, and the thriving communities of the Yakima valley must realize that they are due to irrigation. And those people who have lived here and have watched the country develop have a clearer vision than outsiders of what the future of this valley will be when the project is finally completed.

IRRIGATION PROJECTS NEED BETTER METHODS

Taking the projects as a whole the general statement may be made that the farms which are being cultivated under the best methods of crop rotation and properly fertilized are increasing their yields from year to year; whereas the farms which are being handled on a one-crop basis are producing less each year. There is still much room for improvement in farming methods on the majority of the project farms, and there is too wide a difference between the results obtained on the average farm as compared with the best. More attention should be given to building up the soil through proper crop rotation, feeding of livestock, and fertilizing, together with more careful irrigation.

IRRIGATED LAND SETTLEMENT

W. G. SWENDSEN, Commissioner of Reclamation of the State of Idaho, at the recent session of the American Society of Civil Engineers at Salt Lake City, discussed in part as follows a paper presented by A. Griffin of the Canadian Pacific Railway Co. on the subject of land settlement on irrigation projects:

It is no easy task to fabricate a farm from the desert, and to accomplish the feat a person must be equipped either with ample funds or an unlimited supply of physical strength, endurance, courage, and a mental development capable of directing these forces; after this is accomplished, the farm provided and improved, the larger problem, its successful operation, and the enjoyment of life during 365 days each year which must be spent upon it, remains to be solved.

The matter of colonization, after all, is but mere traffic in human beings, and a full realization of the seriousness of the business must be appreciated if success is to be obtained. Success is used here in its broadest sense and implies not only financial gain or prosperity but happiness and contentment as well. Families should not be encouraged to abandon cities or other homes to take up life on the farm until it is definitely known that they are equipped not only financially but, in addition, have general fitness for the new life they are to undertake.

I submit that there is no more interesting or wholesome work than that of farming under irrigation, dealing as it does with the natural elements of sunshine, soil and soil fertility, atmosphere, water, etc., and the bringing together of these in maturing plant life. The most can not be had from such a vocation unless the participant is equipped with at least a fundamental knowledge of agriculture and the processes through which the seeds and plants must pass in their route to maturity. It would, indeed, be a dull and uninteresting life to the engineer or men in other professions if they were obliged to subscribe to mere formula in the building of structures and the doing of other tasks, and thus proceed without a definite knowledge of the conditions and things with which they necessarily deal.

The irrigated farm, offering as it does conditions well adapted to intensive farming, the rotation of crops, and with it the continued building up of soil fertility, and the adjustment of crops to meet market conditions, offers advantages not enjoyed

in agricultural territories where irrigation is not practiced.

As long as the farmer must sit on his plow from day to day with no other thought than that of how nicely the furrow turns over, or how difficult his daily manual tasks are, farming will be a drudgery. But when he is able to analyze the simple, interesting, and beautiful processes through which plant and animal life pass in their route to maturity drudgery will cease and his daily tasks will, in my opinion, become a real pleasure.

It is my belief that if colonization on irrigated areas is to succeed settlers must be selected from persons trained and skilled in the art of irrigation farming and who are adapted by natural inclination and environment to the work which they are undertaking.

GERMANY CONTINUES HOME COLONIZATION

F. J. Rohr, writing in the International Review of Agricultural Economics, states that "the most recent legislation on home colonization in Germany makes it clear that notwithstanding certain more radical tendencies of the postwar period, the earlier principles directing land settlement and agriculture have been affirmed. The policy of home colonization has been pursued methodically and on practical lines, and nothing has been allowed to modify its purpose, which consists, not in a blind splitting up of the large estates, nor in the creation of farm holdings of some ideal size and type, but in the establishment of the best possible proportion between the various classes of coexistent properties. Notwithstanding all the legislative measures which guarantee the possibility of finding the lands required for settlement, there have been no actual systematic attempts to destroy the striking diversity existing in agricultural conditions in Germany, and there is a general evidence of a desire and tendency to secure an organic and steady development of home colonization. It is all important to maintain the balance between social needs and the material necessity for an increase both in the population and in the food supply."

Regularity in the use of lights, feed, and water for the poultry flock makes for regularity in egg production.

GRANDVIEW COMMUNITY DAY

THE following account of the seventh annual community day, held by the town of Grandview on the Sunnyside division of the Yakima irrigation project, Washington, was furnished by F. E. Fyfe, president of the board of directors of the Sunnyside Valley irrigation district. This healthy spirit of cooperation between the business men and the farmers might well be emulated by other towns on the projects.

Grandview, one of the live towns on the Sunnyside division, Yakima project, several years ago started an annual celebration at the close of each school year which is known as community day. On these occasions business houses all close their doors for the day, the farmers are invited into town, and the occasion is made one of general get together and offers splendid opportunity for neighbors to get better acquainted.

The seventh annual community day eclipsed all previous days in point of attendance and enjoyment.

The day opened with a parade in which business houses with representative floats, school children on decorated trucks, and several civic organizations participated.

After the parade, which ended at the public school grounds, a picnic dinner was the order of the day, free coffee and lemonade being furnished by the Commercial Club, under whose auspices the day is always given.

The program for the afternoon consisted of drills by several civic organizations, a band concert, sport contests for the boys and girls, a baby show, a baseball game, and "barnyard golf."

It is estimated that 3,500 people attended the community day exercises, most of them being residents of the town and fruit growers and ranchers of the immediate vicinity. There are always, however, a number of people present from the nearby towns of Sunnyside, Mabton, and Prosser.

The Board of Survey and Adjustment, consisting of ex-Gov. Thomas E. Campbell, chairman; Hon. F. M. Goodwin; and Mr. M. M. Moulton, were making a physical inspection of the Sunnyside division at the time and were entertained at the hotel by the chamber of commerce. Talks were made by all three members of the board and everyone enjoyed the meeting.

Grandview was one of the first towns in the Yakima Valley to institute a community day, and so successful have they been that many other towns in the valley have adopted the idea of getting the farmers and business men together and are annually holding some sort of a community celebration.

The Sunnyside division, on which Grandview is located, is one of the best in point of average production per acre of all Government projects, the total crop yield for this division for the year 1924 being \$4,923,821, or an average yield per acre of \$63.02, with an average yield per acre for the past ten years of \$95.46. With good soil and an abundance of water, and populated by a class of people determined to know each other and learn of each other's troubles and aspirations, it is no wonder that here we find reclamation working out to the best advantage.

The cherry crop is being harvested, and there are satisfactory prospects for a good crop of every kind. A spirit of optimism prevails and the valley is rapidly resuming its usual contented and prosperous condition.

Only about 19 per cent of the land area of the United States is at present utilized for producing crops, and it has been estimated that it will be possible to increase this to perhaps 50 per cent of the total area when required.



Potatoes form one of the staple crops on the Minidoka project, Idaho

THE WATER SUPPLY OF THE PROJECTS

Storage on hand and prospects for natural flow were such that possibility of shortage in irrigation supply was, on July 1, apparent only on the Carlsbad and Okanogan projects as a whole and on some 3,000 acres of Truckee lands on the Newlands project.

Carlsbad project storage was exhausted in April, and the stream flow since that time has been only a fraction of the water ordinarily used. A small flood reached the project the last few days in June. A large part of the project is in cotton which showed the effects of lack of moisture, but can still be expected to produce a crop if moisture is soon supplied. The alfalfa crop had been seriously affected. In most years rains replenish project storage in July.

On the Okanogan project the season for gathering the project water supply has passed, and lands not possessed of very early rights, comprising the larger part of the project, will probably receive a little less than one-half a normal supply. Conditions are, however, materially better than in 1924, and a fair apple crop, the principal project crop, is expected.

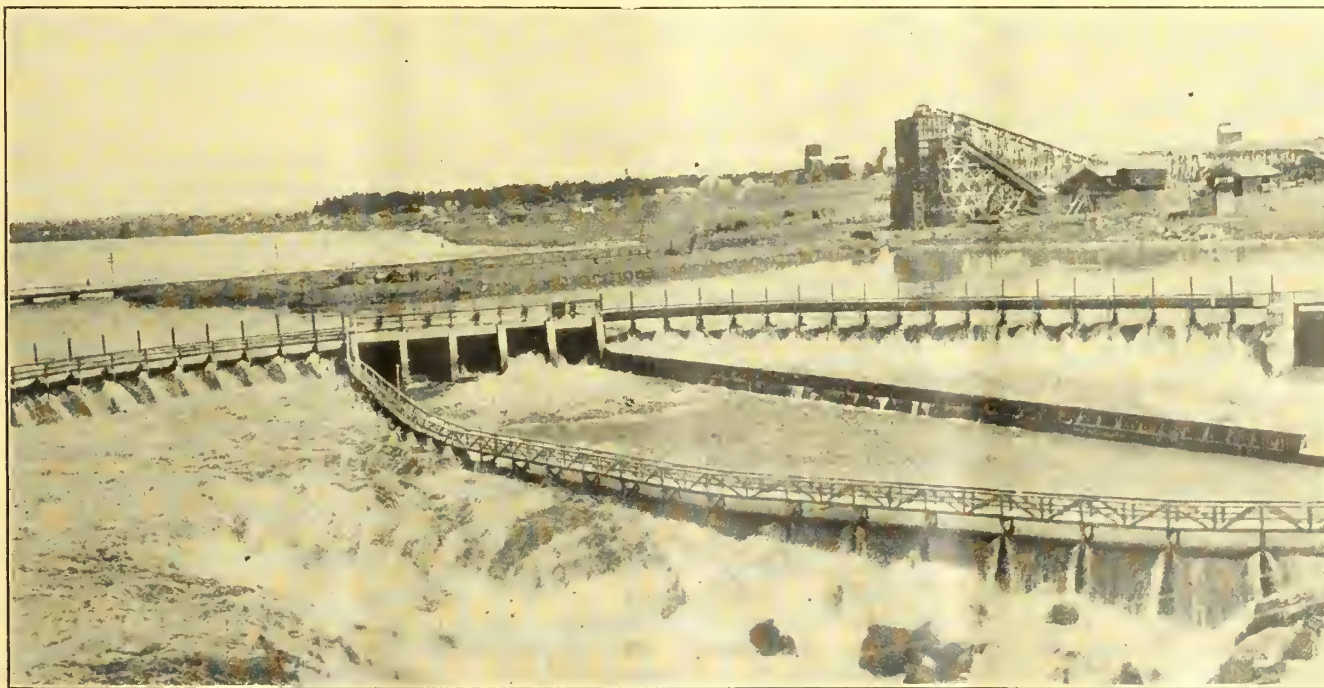
On the Newlands project Lahontan storage is ample to supply the Carson lands by gravity, and an ample supply can be furnished the Swingle Bench lands by pumping over a period about one-half as long as in 1924. Fernley Bench lands in 1924 were badly short from June 1

STRAWBERRY VALLEY PROJECT NOTES

DEVELOPMENT of the dairy industry with appurtenant butter, cheese, and evaporator factories should be fostered among the water users of the project. Water users who have small dairy herds are financially sound and meeting their obligations. The dairy business is especially necessary in filling out the cycle of farming operations and building up the land for greater production. It provides a monthly income during those periods of the year when the majority of farmers are without remunerative work. Many of the water users are closely scrutinizing the accomplishments of their neighbors who have dairy herds, and it is believed that many are realizing the necessity of having an all-the-year-round industry and income. There has been a slight increase during the past year in the number of dairy cattle, and it is expected that gradually the industry will grow on the project. In fact, general information of various kinds has been furnished to one large condensed-milk manufacturing company, with the view of getting them to establish a factory on the project. This company provides its own system of financing the farmers in the purchase of dairy stock on reasonable terms.

to October 1, but this year are not expected to be short much before August 1.

A large part of the project area is extremely fertile and especially adapted to the growing of such truck as peas, beans, tomatoes, cabbage, cauliflower, head lettuce, celery, and other table foods. The raising of these crops is, however, more or less new to the majority of the project water users, and no organization at present exists to handle properly and ship this class of produce to outside markets. A large packing company has opened a canning factory near Spanish Fork. The establishment of this industry on the project and the gradual education of the water users to the growing of crops for canning purposes will be of great assistance in increasing the average annual gross acre income of those water users whose lands are adaptable. The benefits accruing to the project from the introduction of such industries are hard to estimate. New and more economical methods of irrigation, peculiar to the various crops, are introduced, which in many cases result in a large saving of irrigation water and the abandonment of many haphazard irrigation methods which in the past have resulted in wasting large amounts of water. These factories provide field men who examine the crops and teach better methods of irrigation and culture.



Early stages of construction on the American Falls dam. View from east end of railroad bridge

PUMPS INSURE AGAINST DROUGHT

THE shareholders of the Salt River Valley Water Users' Association voted on April 7 to develop additional pump water in case the anticipated drought continues. This year the project will pump close to 300,000 acre-feet of water, and there will be available in addition to the normal flow in excess of 2.6 acre-feet of water for every acre of the project. For some lands this means a shortage even with considerable effort to conserve water, but in general there will not be any serious curtailment of production this year.

It is expected that the new pump development will be completed by August 1, and that the project will be able to pump nearly 400,000 acre-feet of water next year in case the anticipated drought continues. Assuming even the driest years of record for the next two years, there will still be available with this new development 2,000,000 acre-feet of water for the seasons of 1925 and 1926. In 1926, assuming a continuation of drought condi-

tions, this will mean 2.7 acre-feet per acre delivered to the farmers in addition to the normal flow. For full production this will mean that every effort must be made by the farmers to conserve water, and for some sections will necessitate some curtailment in acreage or production, but in general the project as a whole will not be affected.

It is believed, therefore, that with the completion of the new pump project a serious shortage of water, which would affect intrinsic values, will have been permanently prevented.

Under the power contract and interchange of power agreements, there will be ample power for all the pump projects to which power is served. The estimate on the power system for next year, even assuming that the drought continues, is 110,000,000 kw. h., approximately 60,000,000 of which will be hydroelectric and the balance steam. This is on the basis of the driest year of record next year.

REPAYMENT POLICY OUTLINED

THE general policy has been adopted by the bureau and ratified by the Department that charges due must be paid in every case in which the water users are financially able to make payment. The various relief acts and the adjustment act of 1924 are designed to provide only such relief as may be needed. Subsection r of the adjustment act provides for funding of delinquent charges when adjustment contracts are made, but as a prerequisite to the execution of such contracts the Secretary of the Interior, in his discretion, may require compliance with any reasonable conditions, one of which will no doubt be that operation and maintenance charges for 1924 and 1925 be paid if the financial ability of the water user permits. The same principle is applicable to the payment of construction charges, but naturally preference will be given to the payment of operation and maintenance charges where the financial condition of applicant will not permit payment of both.

Construction and operation and maintenance charges accruing prior to 1924 and delinquent when adjustment contracts are made will be funded as the law provides, but this does not mean that pending possible execution of such contracts water users may deliberately refuse to make any payments, even when financially able to do so merely for the purpose of having charges accumulate to be funded under subsection L of the act mentioned. The law makes it optional with the Secretary of the Interior to amend outstanding contracts, and in this connection he may impose such reasonable conditions as he may find the circumstances justify as a prerequisite to the amendment of present contracts.

This policy is one of general application, and there is no disposition to prejudge the necessity for relief or the extent to which relief will be granted. Careful and sympathetic consideration will be given to all facts presented and recommendations made by the Board of Survey and Adjustments and other data submitted bearing upon the financial and economic situation, and such action will be taken and recommendation made to Congress as the conditions so developed seem to warrant. Good faith demands that each landowner make payments when able to do so and he should not be deterred from this course by the possibility or hope that all delinquent charges will be funded. Such action would evidence not only lack of good faith and proper regard for contractual obligations, but may lead to disappointment on the part of the landowners.

The voting of the pump assessment by a 4 to 1 vote has been a great relief to every thinking person in the Salt River Valley, as it will mean the addition of one extra irrigation this year, and nearly a full supply next season, even under the worst conditions.

FARMERS SHOW PROFITS ON LAST YEAR'S CROPS

The average cost last year of producing a bushel of wheat was \$1.22 compared with an average sale value of \$1.43 a bushel.

The average cost of the corn crop was 82 cents a bushel compared with a sale value of \$1.10 a bushel.

The average cost of oats was 50 cents a bushel compared with a sale value of 57 cents a bushel.

Cotton cost an average of 18 cents a pound and had an average sale price of 23 cents a pound.

Average production costs of potatoes were below the average selling price.

Costs include charges for labor of the farmer and his family and a charge for the use of the land on a cash rental basis, so that where the cost just equaled the price received the farmer was paid for his time and his investment.

DESCRIPTIVE TABLETS SUGGESTED FOR DAMS

It has been suggested that a suitable metal tablet be placed on each of the large storage and diversion dams of the bureau containing such information as the capacity and area of the reservoir; height, crest length, volume, and cost of the structure; and possibly the names of the principal administrative officials of the Department of the Interior and the bureau during the time of construction.

The cost of such tablets would be relatively small, they would serve a useful purpose in furnishing information readily to tourists, and doubtless the various civic and other organizations on the projects would be glad, as a matter of pride, to defray the cost of the tablets.

The superintendents of the Boise and Shoshone projects have already been requested to furnish drawings of such proposed tablets for the Arrowrock and Shoshone Dams, respectively.

The primary horsepower available for use on farms is greater than that used in mining and manufacturing, and is second only to that required for railroads.

POINTS TO CONSIDER IN DAIRY HERD

GOOD individuals of whatever breed is selected should have first consideration by the man about to launch himself into the dairy business. As between breeds, there are three points that should be considered: (1) The breed that predominates in the locality where the new herd is to be located; (2) personal preference; and (3) market requirements for the product.

There are a number of advantages to a dairyman in having the same breed as his neighbors. A dairyman just starting with purebreds may feel that since his neighbors have one breed of cattle he should get another breed so as to have a monopoly in the business of selling breeding stock. There is no question about the monopoly, but there would be no business to monopolize. It is difficult for an isolated small breeder to dispose of his stock to advantage, while if there are

many breeders with the same breed buyers are attracted to the locality because of the better chance to get the desired animals from one or more of the several breeders. Other advantages in having the same breed as the neighbors are the opportunity to exchange bulls or to own good bulls cooperatively; to take advantage of breed sales of surplus stock; and lastly, the advantage of bringing the community together in other endeavors which usually result where there is but one breed.

Because a man will usually do best with a breed that he likes, it is well to give this personal preference the right of way when there is no other breed already established, providing, however, that just as high quality animals are available in the preferred breed as in some other breed.

Market requirements for the product should not be overemphasized, for the

reason that these requirements may fluctuate from one year to another, and, obviously, the dairyman can not change breeds with every change of market requirements.

In summing up the matter of which breed to select this point should be kept in mind: there are good cows and poor cows in all breeds, and, other things being equal, the breeder or dairyman who gets good individuals to begin with will have a good chance for success, no matter what breed he selects.

The several breeds recognized as dairy breeds in the United States are the Ayrshire, Brown Swiss, Dutch Belted, Guernsey, Holstein-Friesian, and Jersey. Although much alike in what is known as general dairy conformation, these breeds differ to some extent in certain characteristics. What these characteristics are, the factors to consider in selecting a breed, and the history and origin and development of the breeds, are questions of interest to both the beginner and the established breeder of dairy cattle. These topics are discussed in a new bulletin issued as Farmers' Bulletin 1443.

THE SILO HELPS THE DAIRY HERD

THE silo makes it both possible and profitable to keep more livestock on the farm.

It provides a convenient and cheap storeroom for roughage, preserving it in a succulent and palatable form.

It combines more good qualities and greater profits on the investment than any other building on the farm.

Corn and sunflower silage, fed in combination with clover, alfalfa, or vetch hay, provides a forage ration succulent, palatable, and properly balanced.

It cheapens the cost of milk or meat, prevents waste in feeding, and saves labor.

Any dairyman who can break even without a silo can easily make 25 per cent profit by the building and proper filling of a silo.

Crops can be put in the silo during weather that would make it impossible to cure hay or other fodder in any other way.

As a business proposition any dairyman with a half dozen or more cows can afford to borrow money to build a silo. It would pay for itself in a short time.

The important factors of a good silo are: It should rest on a solid foundation, should be absolutely air-tight, smooth inside, and the height should be three times the diameter.

Thirty pounds of corn silage and 15 pounds of alfalfa hay make a well-

balanced daily ration for a 1,000-pound cow. With this forage ration, a cow that is giving less than 20 pounds of milk a day can not profitably use a grain ration.

For a cow giving over 20 pounds of milk a day the addition of 1 pound of mixed

grain for each 5 pounds of milk will usually pay a profit.

An analysis of numerous reports of cow-testing associations indicates that the cows fed a silage ration average about 25 per cent greater production than those that are fed dry forage.—*Building and maintaining a dairy herd, U. P. System.*

FARMS SHOW IMPROVED FINANCIAL RETURNS

An average cash balance of \$1,024, the margin of cash receipts over cash expenses, was returned to owner-operators in 1924 on 15,103 farms surveyed by the Department of Agriculture. In addition to this margin these farms increased inventories of crops, livestock, machinery, and supplies \$181, making an average return of \$1,205 for the use of \$17,260 of capital and the labor of the farmer and his family. These farms also produced food and fuel consumed on the farm estimated to be worth \$266 on the average. A similar survey in 1923 on 16,183 owner-operated farms averaged a cash balance of only \$890, increased inventory of only \$130, and produced food and fuel worth \$265 on capital amounting to \$17,490.

SAVE YOUNG LIVESTOCK AND INCREASE INCOME

Cutting down the high and costly death rate among infant livestock is one of the farm problems for which the farmer must apply the solution himself. The causes of early deaths in livestock fall into three general classes:

1. Conditions little influenced by treatment: Malformation, extreme feebleness or extreme prematurity, certain accidents during birth.

2. Conditions capable of considerable reduction, chiefly through proper hygiene, sanitary isolation, and medical treatment: Tuberculosis, acute respiratory diseases, certain acute contagious diseases, some forms of animal parasitism.

3. Conditions capable of a very great reduction through proper feeding, care, and sanitation: Acute gastrointestinal diseases, goiter troubles, prematurity (if not extreme), many forms of animal parasitism.



Boise project strawberries add materially to the farmers' income

THE PUNJAB CANAL COLONIES

THE April-June issue of the International Review of Agricultural Economics contains an interesting article on the subject of "Indian irrigation and the Punjab Canal colonies," by D. N. Banerjea.

Referring to the watershed between the Jhelum and the Sutlej, the article states that "the Lower Chenab Canal has converted this wilderness into a garden. Before the process of colonization began in 1892, cultivation was confined to the fringes of the rivers. To-day, the value of the crops grown on the lands irrigated by the Chenab Canal varies between 16,000,000 and 20,000,000 pounds sterling. This canal carries the discharge of 10,700 cubic feet a second, which it distributes with the help of 2,243 miles of distributaries drawn from 427 miles of the main canal. This canal has proved most remunerative to the Government; the capital account stands at 3,500,000 pounds, on which it yields an annual return of 47 per cent. Its revenue account showed up to January, 1924, an accumulated profit of 16,500,000 pounds after all interest charges and working expenses had been met."

The fundamental objects of the schemes that have been put in operation in the canal colonies are summarized, in part, as follows:

1. The aim is to plant the nucleus of a village community, particularly in those areas where the population has not had sufficient skill and capacity for work to develop naturally into an agricultural community. In order to maintain cohesion among the cultivators, efforts have been made to settle members of the same community in certain villages. The ground is thus prepared for cooperation between the richer and poorer elements among the settlers. The weaker ones

"I sincerely believe in the principle of cooperative marketing as an important means of placing our agriculture on a more profitable basis. From the viewpoint of the farmer the cooperative is not a mere business organization in which he invests a small part of his capital. It is an organization into which he places his entire year's work and that of his family. His welfare and that of his family are wrapped up in the success of the association. Let us have a more thorough understanding of the functions and responsibilities of the cooperatives and I predict for them a large measure of success."—Secretary of Agriculture Jardine.

can, when occasion arises, borrow seed, tilling implements, and even money from the better off. This experiment has, on the whole, worked quite satisfactorily.

2. In the selection of candidates it has always been the aim to encourage those who are solvent at the beginning of their careers and who are equipped with sufficient resources to grapple with the initial difficulties attendant on settling down in new surroundings.

Pointing out the vast difference between ordinary agricultural development and development under irrigation, the article refers to the following statement by Sir John Maynard: "What is wrong in these matters is that the department concerned has not realized the distinction between the slow development of the normal district and the complete revolution which takes place when irrigation is introduced in a desert. For the former the ordinary principles of gradual addition to existing facilities are appropriate. For the latter the question is one of creating a new machinery for an almost entirely new population, and substantial special appropriations are needed."

In conclusion the article states that the greatest need of the cultivators is a thorough comprehension of how agriculture may be made profitable and the methods whereby this end may be achieved, and that the average cultivator needs, above all, training in organization.

USE OF POWER ON AMERICAN FARMS

The American farmer ranks next to the railroads and leads both the manufacturing and mining industries in the use of power. Approximately 60 per cent of the power utilized on farms is animal power. Tractors account for nearly 17 per cent, motor trucks about 4 per cent, stationary engines 12.5 per cent, windmills a little more than 1 per cent, and electrical installations 5.5 per cent. The use of this power, together with labor-saving machinery, has greatly benefited the American farmer. The average farm worker now cares for approximately three times as many acres of crops as did the worker of 75 years ago.

The cost of animal power per horsepower-hour varies considerably in different sections of the country, and this variation has an important bearing on the question of the advisability of substituting mechanical power for animal power.

Wheat is about equal to corn for feeding swine. Oats, if ground and hulls sifted out, is one of the best grain feeds for little pigs.

NEW RECLAMATION ERA

VOL. 16

SEPTEMBER, 1925

NO. 9



THE GIANT CACTUS OF THE ARIZONA DESERT

I AM NOT in favor of waiting until scarcity of food has been demonstrated to begin preparations for its production that will require 25 years to complete. But it is imperative that we complete and settle those projects that are unfinished on some plan that will insure permanency and secure ownership in those living on them.

In a conversation with President Coolidge on reclamation, he said: "Lay your plans for 20 years in advance. The population of this country is increasing very rapidly. The fertility of the older farms is being exhausted. We will need that new country to furnish food and produce wealth for the people of the United States."

*HUBERT WORK,
Secretary of the Interior.*

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

SEPTEMBER, 1925

No. 9

SECRETARY AND COMMISSIONER GET FIRST-HAND DATA

Extended visit affords personal knowledge of economic conditions on projects where works are being built to reclaim new areas and where appropriations have been made for beginning such works

IN order that Secretary Work and Commissioner Mead might have a first-hand personal knowledge of economic conditions on projects where works are being built to reclaim new areas and where appropriations have been made for inaugurating such works, a visit lasting one month and extending through six arid States was inaugurated by a conference with State officials and Members of Congress at Cheyenne on June 21.

Addresses were made at Cheyenne by the Secretary and the commissioner¹ explaining the purposes of the inspections to be made and outlining the problems of reclamation in solving which it is believed the State and Federal Governments should cooperate. With the Secretary and commissioner were W. J. Donald, of the Interior Department; W. J. Carroll; Dr. Ernest Clark and wife; Harry J. Brown, of Washington, representing western newspapers; and Malcolm Cutting, of St. Paul, representing the Country Gentleman. Several State officers and the Wyoming congressional delegation and officials of the Burlington Railroad were members of the party in the inspection of Riverton and Shoshone projects. In Montana, Governor Erickson joined in the inspection of the Sun River project; representatives of the Great Northern and Northern Pacific Railroads accompanied the party through Montana and Washington. Senator Jones, of Washington, took part in the inspection of irrigated areas and in the conferences with settlers in Washington.

In Oregon Senators McNary and Stanford and Congressman Sinnott and Governor Pierce participated in the conferences at Portland and all except Senator McNary took part in the inspection of the Baker, Vale, and Owyhee projects. In Idaho conferences were had with Governor Moore and State officers and all the members of the congressional delegation; Senator Gooding and Con-

gressmen French and Smith participated in the inspection of areas for which works are being built or plans being made for construction. There were frequent meetings with water users and a number of important conferences with chambers of commerce and development organizations.

RIVERTON PROJECT, WYO.

The Riverton project, in the Big Horn Basin in Wyoming, was the first project inspected. It is to irrigate 100,000 acres at a cost of about \$100 an acre. The diversion dam in Wind River and about 16.5 miles of main canal have been completed at a total cost to date of \$2,800,000. The completed section of the main canal can supply water to 10,000 acres of privately owned land and 5,000 acres of public land. Prior to leaving Washington the question had arisen as to how soon an attempt at settlement should be made.

If all the unexpended appropriation for 1926 is used to build laterals water can be supplied to irrigators next year. If the appropriation is largely spent on continuing construction of the main canal land-

owners under the project would have to wait at least another year before beginning cultivation. It was decided, therefore, to use the appropriation to complete the laterals and to notify all owners of land under those laterals that they could have water for irrigation on a generous water-rental basis on a three-year contract beginning next spring. If these owners respond favorably money for an extension to new areas will be asked for. If not a halt will be called on main canal construction until the lands now supplied with water are irrigated.

WILLWOOD DIVISION OF THE SHOSHONE PROJECT, WYOMING

The next area inspected was at Willwood, where the main canal and laterals to irrigate 15,000 acres are nearing completion. This land is all public. The average construction cost will be about \$100 an acre. Ten thousand acres of this area have gentle uniform slopes and are well adapted to intense culture. Settlement at the outset will be restricted to this area. Conferences with railway officials interested in this development and with State officers of Wyoming revealed grave doubts as to whether this area can be settled and farms developed under the present depressed condition of agriculture. More aid and advice in farm development and in working out a cultivation program are regarded as needed to make these farms attractive to settlers. No applications for farms here have been received.

It was decided to postpone all efforts at settlement until prospects are more encouraging.

SUN RIVER PROJECT, MONTANA

The Greenfields division of the Sun River project is located west of Great Falls, Mont. Works have been built and water is now supplied to farms

IT DEPENDS ON WHO DOES THE FIGURING

In the course of one of his addresses on his recent trip to the projects the Secretary of the Interior referred to the fact that "figures never lie, but liars figure," and illustrated his point by the following story:

"As one of your citizens said to me here yesterday, he quoted a farmer as saying: 'I know that I settled on this farm many years ago and I know that I raised my family and I know that I schooled them and I know that I am not in debt, but my son came home from the agricultural college recently and he, with a pencil and piece of paper, showed me where I was broke.'"

¹ See NEW RECLAMATION ERA, July, pp. 97 and 102.

ECONOMIC ASPECTS OF PROPOSED PROJECTS ANALYZED

New legislation or modification of present legislation essential in order to put into effect carefully considered plans for aided and directed settlement to insure success

(Continued from page 129)

scattered throughout an area of 40,000 acres. Of this, 13,000 acres were irrigated in 1924. The plans for this project contemplate building a reservoir to hold 195,000 acre-feet of water and for extending the distributing canals to irrigate 100,000 acres.

Thus far no construction payments have been asked for on this division. Water has been supplied on a rental basis. One reason is the uncertain water supply which will continue until a reservoir to hold back flood water is built. This will greatly improve conditions for those prepared to use more water, but it will add largely to yearly payments by irrigators. Settlers on the project are not now prepared for this as they are heavily in debt and have been unable to fully improve or equip their farms. There is little prospect of betterment unless they can have their present debts refunded and reduce their interest obligations. To properly cultivate the 40,000 acres now supplied with water would require about 250 more farmers, and if the whole 100,000 acres are brought under cultivation it will need about 1,000 additional farmers.

One year ago in considering what should be done with this project, the commissioner was influenced by the need of settlers for a large and more reliable water supply to recommend the construction of a reservoir at Beaver Creek, but he coupled with that recommendation a statement that with it should go legislation which would insure a definite crop program and financial aid to settlers who would lack capital to fully improve and equip their farms. Congress accepted this view and provided that the State should secure settlers and give them financial aid in farm development. It was not required that this aid be extended now, but the bureau believed that before construction contracts are made some assurance should be had from the State that it was favorable to this legislation and would aid in carrying it out when the time arrived. A conference was arranged with Governor Erickson, but he did not feel warranted in either assuming any definite obligation now, or in promising that he would recommend legislation authorizing such aid by the Legislature of Montana at its next session. In the absence of any such assurance, it was decided to postpone for the present a decision on construction. Meantime negotiations are being carried on with water users regarding the contract they

must sign for the repayment of project costs.

To complete these storage works and extend the canals would mean an additional expenditure of about \$5,000,000 and a water-right payment on good land of about \$100 an acre. This is larger than the water-right payments on either Milk River, Lower Yellowstone, or Huntley projects in Montana where settlers are finding it difficult to meet payments and in some instances are not doing so.

THE KITTITAS DIVISION OF THE YAKIMA PROJECT, WASHINGTON

From Montana the party went to the Kittitas division of the Yakima project in Washington. This division has a total area of 70,000 acres, of which about 60,000 acres are in private ownership. The remainder is owned by the Federal Government and the State of Washington. The total construction cost, including the proportionate share of the cost of the Tieton Reservoir, will be about \$11,000,000, or \$161 an acre. In recommending an appropriation for this construction, the bureau coupled it with a statement that aid in settlement and farm development should be provided. Provision for this aid was incorporated in the appropriation for the project. It requires the State of Washington to subdivide and settle the land, and furnish financial aid in the development of farms. In a conference with Governor Hartley, of Washington, he explained that he did not feel warranted in entering into such an obligation. The department, therefore, has no choice but to postpone construction until there has been further legislation. Investigations into the things which will affect the feasibility of the project are being continued, a soil survey is being made, and the lands are being divided into six classes based on productive values. Arrangements have been made for an appraisal of the present value of the land, which would be a basis of its sale to settlers when subdivision takes place. The expenses of this are being paid out of the appropriation for secondary projects.

UMATILLA PROJECT, OREGON

At a conference in Portland the Stanfield and Westland irrigation districts, which are purchasers under Warren Act contracts of water rights in the McKay Reservoir, which is a part of the Umatilla project, asked that the Government purchase the irrigation works of those districts

and provide for their enlargement and reconstruction. No assurance was given that this will be done. It was stated that the financial condition of these districts is such that they will be unable to make these improvements without Federal aid or to pay for the stored water unless the Government finances the enlargement of their canals.

A report on the above-mentioned Umatilla project shows the importance of careful soil surveys and appraisals of land values before any new projects are undertaken. From this report the following statements are copied:

On the Umatilla project there are 4,473 acres of class 6 lands in a compact area. This area represents 202 ownerships. Eighty-two units are still in their wild state. One hundred and twenty of the units have been settled at one time or another. Ten of the original settlers remain. There are 32 owners living on the land at present, most of whom are working out for their living. The total cultivation on the 4,473 acres is approximately 500 acres.

Water is delivered to these settlers every 9 to 10 days. Seven acre-feet minimum is supplied to these lands at \$1.65 per year and 75 cents per acre-foot for additional water except for newly sown crops, when 25 cents per acre-foot is charged. The average amount of water delivered to these farms in 1923 was 9½ acre-feet an acre. One farmer this year used 56 acre-feet on 20 acres for the month of May.

The 32 resident settlers are scattered, which necessitates the operation of all the ditches and pipe lines traversing the area. If all of the class 6 lands were excluded from the irrigable area and water-right applications canceled it would eliminate operating the following systems: Z, ME, RI, and RIJ, and possibly the MB. To do this would require canceling or otherwise removing the water-right applications on perhaps six tracts now classed as No. 3.

These lands have taken a frightful toll from those who have attempted to cultivate them. On section 34, served by the Z line, eight homesteaders settled, built houses, and cleared the land. Only one remains, and he works out as a carpenter. Recently an old man and his wife traded a Montana stock farm for one of these tracts. The owner of the tract obtained it by foreclosure of mortgage, and this was his way to "unload."

Most of the lands are delinquent in their charges from 1921 to date in sums from \$15 to \$800. One man owes \$2,067 water charges on 70 acres. There are three tracts (70 acres) that have paid up water rights. Of the owners residing, 19 are paid up to date. A few of the nonresidents also are paid up.

Future trafficking in these lands should be stopped. They are uneconomic and can not return the cost of the irrigation works.

BAKER PROJECT, OREGON

On July 9 an inspection was made of the Baker project, for which \$500,000 was appropriated by the last Congress. This project has an area of about 27,000 acres. There is a question as to its feasibility because of the steep and irregular slopes to be irrigated. For several years Congress has appropriated money for beginning construction, but doubt as to the economic results has caused the department to postpone construction. An economic report prepared in 1924 states the project is feasible if provision is made for giving agricultural advice and direction to settlers and extending financial aid in the improvement and equipment of their farms. Nothing has been done in the way of legislation, State or Federal, for giving this aid. Construction is being delayed until further investigations are made as to feasibility under the law as it now stands.

VALE PROJECT, OREGON

The Vale project, authorized by the last Congress, has some unusual features. Instead of building storage works to provide water that could not be supplied from a direct flow of the stream, the water supply is to be purchased from the Warm Springs irrigation district which has surplus water in its reservoir. The price to be paid by the bureau for this water has been fixed at \$8 an acre, payments to be made as appropriations are provided by Congress. The lands to be irrigated lie above the Warm Springs irrigation district. Because of their elevation above the stream a long canal, passing through difficult country, has to be built. The construction of this canal will be costly and the estimated average cost of water rights is \$126.50 an acre. There is considerable variation in the quality of the land, and the price of water rights will vary with this, the aim being to pay on the productive value of water. The land is now being classified as a basis for fixing these charges.

The appropriation for this project has a provision similar to those for Sun River and Kittitas. The State is required to become responsible for the settlement of the land and the development of farms. The bureau is prepared to begin the construction of this reservoir whenever assured by the State of Oregon that the State will do this. The governor accompanied the party in its inspection of the project, but was not in a position to announce what he thought the State should do. Of the 28,000 acres in this project 24,000 acres are privately owned. Thirty-eight per cent of the land of the project is owned by two companies. Before beginning construction all owners of surplus land will be required to fix a minimum

price satisfactory to the department, at which this land will be sold to settlers.

THE OWYHEE PROJECT, OREGON-IDAHO

Adjoining the Vale project in Oregon and extending over the boundary into Idaho is the Owyhee project. The water for this project will be taken from the river of that name. A reservoir to hold 570,000 acre-feet of water is to be built and 12 miles of tunnels will be required. Of the 139,000 acres included in this project only 18,000 acres are public land. The remainder belongs to the two States and private owners; 58,600 acres are included in private projects which now obtain water by pumping from Snake River or have an inadequate gravity supply from the Owyhee. These private projects will buy water from the reservoir under Warren Act contracts.

The 139,000 acres of the project are nearly all of superior character, both as to evenness of slope and fertility of soil. It will be necessary to reach an agreement with the owners of large holdings of

which there are a few regarding the price at which surplus land will be sold to settlers. Negotiations to fix this are in progress.

The estimated cost of this project is \$18,000,000 in round numbers. Of this \$12,000,000 will have to be spent before there is any return and it will require about four years to excavate the tunnels and build the storage dam.

Owing to the fact that so much of the land is privately owned, care is being exercised to have all agreements that affect water payments and sales of surplus land properly prepared and clearly understood.

The average acre cost of water rights on the new land of the project proper is \$139 an acre. The cost of water sold under Warren Act contracts will vary from \$25 to \$125 an acre-foot, the cheaper cost being for water turned from the reservoir into the river and the higher one when it has to be delivered at the end of long canal lines.

(To be continued)

DRAINAGE PAYMENT PLAN URGED

THE board of directors of one of the water users' associations on the Boise project recently adopted the following resolutions providing for the appointment of a committee to propose a plan to bring about the payment of all drainage charges now due:

"Whereas the settlers and landowners on the Boise project have been ill advised in regard to the payment of the drainage charges and by following inconsiderate and bad advice, numerous ones have become involved with the Government in controversies over the collection of these charges due prior to 1924, and all have been prejudiced to a greater or less extent in their efforts and rights to receive relief in having delinquent payments of construction and operation charges added to the future undue charges and payment of the same provided for by the 5 per cent method prescribed by the relief act; and

"Whereas it is the belief of this board that the requirement of this payment on the part of the Secretary of the Interior and Commissioner of Reclamation is for the purpose of convincing Members of Congress and the country generally of the good faith of the settlers on this and other irrigation projects and is in line with the policy adopted by the Secretary of the Interior and announced by the President in the publication of the Secretary's letter and report of December 11, 1924, immediately after the passage of the relief act; and

"Whereas it is the belief of this board that the settlers and landowners on the Boise project are very generally heartily in support of the Secretary in their desire to assist in carrying out this policy and believe it to be perfectly sound and the most feasible for reviving the reclamation act and making of it the success for which it was intended and is entitled: Now, therefore, be it

"Resolved, That the President of the Board of Directors of the Payette-Boise Water Users' Association be authorized and directed to appoint a committee with authority and direction to make thorough investigation and propose and report a plan to this board by which the payment of all drainage charges now due both prior and subsequent to 1923 may be secured without permitting the Secretary of the Interior or Commissioner of Reclamation being further bothered or concerned about these charges; and be it further

"Resolved, That the committee be authorized and directed to frame an appropriate expression of gratitude and thanks to the Secretary of the Interior and the Commissioner of Reclamation for their consideration in handling this matter."

CONGRESSMAN CRAMTON URGES NEED FOR COOPERATION

Brief extracts from masterly and convincing speech at Great Falls, Mont., July 26, 1925, by Hon. Louis C. Cramton, Chairman of the Subcommittee of the Committee on Appropriations of the House of Representatives, in charge of the Interior Department bill

WE visited Sun River to-day and yesterday. My feeling is that the future of irrigation in Montana needs to be sold only to the people of Montana. This future is in the hands of the people living on the projects, the people who will in future come on to the projects and the business interests of the State. You do not have to beg for money from the Treasury of the United States. You do not need it. All this State needs is confidence in its own future and willingness to do business in a businesslike way. I come from a beet-sugar district. The building of the two sugar-beet factories we have seen this week is a guaranty of what business men think coming into the State, putting their money in as a business proposition, expecting to do business in Montana and have their money returned to them with profit, and it shows what faith they have in the future of the State.

We have gone over the Sun River project. We have met with the people interested in the project. We have learned of the desire to have the dam constructed to make possible the beet sugar problem. The appropriation was for \$611,000, of which \$500,000 was for construction, providing no money could be used until a district was created. We would rather do business with a district than with thousands of water users. That district I am advised has been

organized and is ready to contract. It is true we also provided:

That no part of the sum hereby appropriated shall be expended for the construction of new canals or for the extension of the present canal system for the irrigation of lands outside of the 40,000 acres for the irrigation of which a canal system is now provided, until a contract or contracts shall have been executed between the United States and the State of Montana, whereby the State shall assume the duty and responsibility of promoting the development and settlement of the project after completion, securing, selecting, and financing of settlers to enable the purchase of the required livestock, equipment, and supplies and the improvement of the lands to render them habitable and productive. The State shall provide the funds necessary for this purpose and shall conduct operations in a manner satisfactory to the Secretary.

That provision was put in. But that provision has nothing to do with the construction of the dam, nothing to do with the existing project, and was only intended to apply to the additional forty or sixty thousand acres hereafter to be developed.

I realize that I have now an opportunity to talk to some of the influential men of the State, some of the men that I hope can see their way clear to cooperate a hundred per cent with us in working for the welfare of your State and the success of irrigation.

The other day I saw a man on a project in your State where there were 15,000 acres in the division and only 4,000 under irrigation, and most of that producing wild hay. Here the Government is spending thousands more than it gets back, even for operation and maintenance, on lands on which you can grow sugar beets, with a factory to use them. What was he paying for 1,200 acres—\$150, or 10 cents an acre. Do you expect that we in the days of this economy program will stand for that kind of business? It isn't business. Montana can not hope to be built up on public extravagance. I became a convert to irrigation not as a local matter but as a national matter. This thing has been prominent in my mind—to find the policy that will be the greatest safeguard for the future of democracy, and looking to the future I hold there is nothing that is so great a guaranty against the destructive spirit of communism and socialism as having men live on the land that they own and till that soil. They are safeguards of our kind of institutions, and every place you have 80 acres of irrigated land and a man living on it who owns it he is a sheet anchor for our institutions. The more I have seen the more I have been convinced the greatest enemies to reclamation in this country are those who want to make a political pork barrel of it, political Santa Clauses taking something off a tree to make it easy for some one to get something for nothing, not a matter of Federal cooperation, but a matter of Federal Government spreading its largess over the country.

Doctor Mead is a man in whom I have very great confidence, and referring to project after project of these new ones I asked him "Is that project feasible?" He said "Not under the existing law, it is not." Then we proceeded to surround them with safeguards to make them successful. Thus we sought to insure the success of these projects—not only protecting the Treasury of the United States but attempting to protect the States where the projects are located through securing the success of these projects in the future. What did we try to do? We tried to provide for an irrigation district so we could do business with an organization instead of a mass of men. Then we sought to protect the settler against exploitation by the speculator, because if we extend this policy to private land and use public money to construct works for



Looking up the main canal on the Lower Yellowstone project, Montana-North Dakota

private lands, we increase the value of those private lands and we create a situation of which the owner is bound to make most use. So they sell the land and skim off the cream of what the Government is doing and the settler doesn't get the benefit of it.

I asked Doctor Mead as to one of these projects, "How long will it be before the Government gets its money back?" "One hundred and thirty-eight years," he answered, "without interest, and then, unless you protect the settler against exploitation, the speculator will get the cream." Then we provided for State local cooperation in financing the settler. On the Sun River we felt when they were bringing in 40,000 or 60,000 acres in addition it was in effect a new project, and as to that new section we ought to seek cooperation. There passed the Senate in the last session and there was favorably reported from the committee in the House a bill that the Federal Treasury should bear the expense of financing these settlers. I do not believe it is the business of the Federal Government. Bringing the water, the Federal Government has done

its part. If the settlers are to be financed that is the obligation of the State or local interest. So we put a provision in. It has nothing to do with the present project, but does provide that before the 40,000 or 60,000 acres adjacent are developed, Montana or local interests must come in and take up the burden of financing. It is perfectly well for the bank to loan money at 8 per cent for a short time on crops, as Mr. Stephenson says they are doing on beets. The farmer can stand that, but settlers who come without a dollar and on projects where they have to spend considerable money to level the land and clear the brush I believe will need some financing. Farmers have bought land at high prices, with interest at 8 per cent, and paying 8 or 10 per cent for every loan needed, and then when there came a little slump they had to pay their 8 or 10 per cent, and the Government loan without interest had to wait. So we feel State cooperation is necessary in the future. What the form shall be we have not provided. We leave that to be negotiated between the department and the State and the local interests.

I am confident irrigation is going forward in this State. In the projects we have visited in the main we have been delighted by the business-like attitude of the men we have met. They intend to pay, and when we can once get that kind of promise translated into action I say to you that then Leavitt, Evans, Murphy, and I, all friends of irrigation, though we differ at some time in degree, can stand up in the House of Representatives and have something substantial to give to these 350 who have never seen the sagebrush, to convince them that reclamation is not the failure it has been pointed out. We can not go to them with whinings and tales of woe and claim that the Government is always wrong. Many mistakes have been made in the past on both sides. Now is the present, and the present in Montana has much of promise for the future. Let us step into that future, we who think we are business men, let us step off into that future trying to serve the interests of this State, and as we go on we hope we can have the encouragement and cooperation of you men who are living next door to the problem.

UNCOMPAHGRE CROPS RENEW CONFIDENCE

A recent statement in the Montrose Daily Press puts the Uncompahgre project, Colorado, on a high plane as a crop producer and money maker. It appears that big crops and good prices are in evidence throughout the Valley, resulting in renewed confidence on the part of the settlers and the attraction of many home-seekers to the project.

The lowly onion is expected to produce to the extent of 1,800 cars, and at \$2 per hundredweight, this will mean more than \$1,000,000 to the Valley. The price of potatoes started at more than \$2 per hundredweight. Wheat began at \$2.50 and \$2.35 as compared with \$1.85 for hard wheat a year ago.

There will also be a good apple crop. The Catlin orchard is expected to market 30,000 boxes of first-class fruit at good prices.

With such bumper crops being harvested or in prospect of being harvested, and with prices looking the best for several years, Old Man Gloom has sort of evaporated around here.

In 1924-25 the value of the farmers' unencumbered capital was approximately \$47,000,000,000.

COOPERATION

A realization by leaders in the cooperative movement that cooperation is not merely a means for obtaining a better price for a single year's crop, but that it is a means for gradually adapting production to market demands, for insuring less wasteful distribution, for reducing the spread between what the farmer receives and what the consumer pays, for aiding in the solution of agricultural credit problems as they arise, for improving the rural life of the Nation, for insuring a better understanding of national and international problems—this realization, implanted by leaders and future leaders in the minds and hearts of the farm people of the United States, will do much to insure not only the success of cooperation, but increased prosperity and stability for the Nation.—The Secretary of Agriculture.

The 1925 agriculture picture is painted in bright colors by the Department of Agriculture. As business conditions also continue good, the combination presents an optimistic national outlook.

CROP SHIPMENTS FROM YAKIMA BREAK RECORD

Ordinarily, from an income standpoint, July is not a very good month for farmers, but the following statement shows that the Yakima Valley, the home of the Yakima irrigation project, Washington, had considerable produce to dispose of and took in a considerable amount of money during that month:

Shipments of fruits and vegetables from the Yakima Valley in the month of July aggregated 845 cars, valued at \$740,000 on board cars. Shipments of soft fruits during the month greatly exceeded those of a year ago.

The shipments of fruit to date this season are greater than for the corresponding period in 1923, which was the record crop year. Already (August 1) this season 626 cars of fruit have been shipped, as compared with 461 cars in 1923. During the month 174 cars of mixed fruits went to market, representing a value of \$300,000. The shipping of 208 cars of potatoes brought \$130,000 into the valley. Apples to the amount of 67 cars started the season's account of apple returns with an item of \$100,000.

Bumper crops, good prices, and optimism prevail.

MAKING A FRESH START IN RECLAMATION

The acid test of feasibility must be applied to all future projects in order that assurance may be had that the reclaimed land shall be capable of repaying the cost of reclamation

Editorial from Portland Oregonian

VISIT of Secretary of the Interior Work and Reclamation Commissioner Mead to Oregon is an earnest of their desire to know from practical observation what should be done to make reclamation in this State a success, and to do it. They come here at a turning point in the history of Government reclamation, when a number of engineering successes have proved financial failures and when settlers have demanded relief while Congress has insisted that future projects be so managed that their products shall repay their cost to the reclamation fund.

Doctor Work has taken charge of affairs at a juncture when a man guided by cold judgment untinctured with sympathy and understanding would be apt to say the only thing to do about reclamation is nothing. Doctor Work knows that at least half the responsibility for past mistakes and failures rests on the Government and that by avoiding repetition of those mistakes and failures the Government can do all that is humanly possible to prevent settlers and others from making their half of the bad record again. Like many other big Federal enterprises, reclamation was undertaken in buoyant confidence that, if Uncle Sam put water on dry land, man, aided by nature, would do the rest, and the money expended would automatically flow back into the Federal treasury. Thought of the wide difference in value between the native growth of sagebrush and four or five crops of alfalfa a year raised visions of a great margin in land value which might be harvested by a city speculator. The opportunity of a good, safe living offered by an irrigated farm seemed so great that it was expected men—real farmers—would stampede to every reclaimed tract, and that thus the land would settle itself.

These illusions have vanished, and the Secretary approaches the task from an angle differing greatly from that of 23 years ago. Being a western man, he does not condemn reclamation by wholesale, but he would confine it to projects that are proved feasible by several tests which his fact-finding commission recommended and which Congress has approved. The great test of feasibility is capacity of the land, when reclaimed, to produce enough, in addition to a fair living for the farmer and to provision for payment of his debts, to repay the cost of its reclamation. That requires settlement of the

land with farmers who can and will make the land produce to its capacity and who would stay there.

On these lines the Government is making a fresh start in Oregon as in other States. The acid test of feasibility is to be applied to the Owyhee and Vale projects before expenditure of the appropriations begins. Feasibility is a broad term, for it covers engineering, cost in relation to possible production on the reclaimed land, settlement by men who will realize the possibilities of production

GOOD TIMES AT HAND

Considering this season by itself, I am convinced that it is going to be a fairly good year for agriculture. Considering this second year of improvement against the previous 4-year background of acute distress, I am ready to call agriculture safely convalescent. I was greatly encouraged in what I saw during my eight weeks' trip through the West.

On the whole I see stronger evidence of the approach of good times for agriculture than I have seen since 1920. One indication of this is the index of purchasing power of farm products, which is now about 90 per cent of what it was before the war, the level of this summer being the highest since 1920.

Moreover, I find an evident return of confidence. Farmers are getting out of the shadow of bankruptcy. Farms are selling once more. Long-standing debts are being liquidated. In short, agriculture appears to be gradually getting its house in order again after the post-war disruption.—The Secretary of Agriculture.

and finance. Doctor Work and Doctor Mead are assured of the cooperation of the land settlement committee of the Portland Chamber of Commerce, but they seek the cooperation of the State in settlement and financing of settlers; at least, that is the inference to be drawn from Doctor Work's remark about waiting "until a law has been passed and appropriation made."

Oregon is in no position to criticize the Federal Government for its mistakes, for the State and those acting under its au-

thority have erred in the same manner. The Government perseveres while profiting by its errors; the State should profit likewise, and Governor Pierce should come out of the pessimist mood he has shown in several speeches and should consider how the State may cooperate properly but effectively.

Selection of the right type of settler is as nearly as possible assured by the joint action of the Reclamation Bureau and the Oregon Land Settlement Committee, but many of them will need loans to the extent of half their investment in order that they may make a fair start and may soon begin payment of reclamation assessments. Congress has not authorized such loans, though they were proposed in the Kenyon bill, and it is attempted to shift this part of the work to the State in making appropriations for the Kittitas and other projects. Governor Hartley refused to pledge the credit of Washington for so large and probably growing a liability, and Oregon may reasonably hesitate for the same reasons to undertake the task directly; but there may be other ways of insuring that settlers who have half the sum necessary to erect buildings and equip farms shall be able to borrow the other half at reasonable interest and terms of payment. The care to be taken that the reclaimed land shall be capable of repaying from its products the cost of reclamation and that the settlers shall be of a type that will remain on the land and make good should make the borrowers good risks from banker's viewpoint. Private owners of land within each project should be placed under contract to subdivide their holdings into certain farm units and to sell only at prices agreed to selected settlers. With these precautions financing of settlers might be undertaken by private agencies.

All that reclamation needs is a new start. The Oregon tracts for making it have been well selected. The most should be made of the opportunity by hearty cooperation of Federal, State, and private agencies in a plan the success of which will be proved by the creation of a farming community that meets all obligations for water and for loans, yet makes a good living for all its members and is in process of becoming financially independent. Such a community is a valuable asset to State and nation, and will be well worth the effort put forth in its creation.

AGRICULTURAL AND ECONOMIC NEEDS OF THE PROJECTS

The successful development of the projects demands that careful thought be given to their agricultural and economic needs as well as to their construction requirements. Some of these needs are outlined below

YUMA project, Arizona-California.—Farming by tenants is much too prevalent on this project, and their places should be taken by settlers.

Grand Valley project, Colorado.—Of about 40,000 acres for which water is now available on the project, including Orchard Mesa lands, some 6,000 acres, largely in private ownership, are yet wholly undeveloped and fully 4,000 acres additional are very inefficiently farmed. To put these lands into proper cultivation at least 200 settlers will be required, and better facilities for long-time and intermediate credit are indispensable.

Uncompahgre project, Colorado.—Farming has been based largely on the production of staple cash crops, with disastrous results in many years owing in part to necessarily heavy freight and marketing charges. It is doubtful if transportation conditions can be improved sufficiently to provide material aid. The project should turn to crops and products better adapted to long hauls and high freight rates. Canneries and other industries for local conversion of products should be encouraged and supported. More and better livestock are needed. Many farmers have failed and left; new settlers are needed to take their places and to aid in the subdivision of larger holdings, but if they are to be successful they must be favorable to more intensive farming and must be properly financed through their development period.

Boise project, Idaho.—More livestock is needed on the farms, and there is a demand for canneries and other industries that will utilize cash crops of high value. High freight rates reduce the profit on bulky crops and sometimes result in losses. About 600 families could be put on the irrigated lands of this project to advantage by subdividing large holdings.

King Hill project, Idaho.—The principal needs of the project are the subdivision of the larger land holdings, more intensive cultivation, and more and better livestock, which, if supplied, will accelerate the development of the project and make the district better able to take over and successfully operate and maintain the works. About 60 new settlers are required. Better credit facilities with loans at lower interest rates are much needed.

Minidoka project, Idaho.—Much of the project is farmed by tenants who in general, together with some of the landowners, do not farm proficiently nor with results satisfactory to themselves. A

number of settlers of proper type are needed to displace these. More and particularly better grades of livestock are needed.

Huntley project, Montana.—Mortgage foreclosures have resulted in numerous holdings in excess of the established farm unit, and afford opportunity for a number of new settlers.

Milk River project, Montana.—A considerable portion of this project is held in large tracts. Good irrigation farming is rarely seen, and large areas are devoted to wild and tame grasses. The present settlers are averse to intensive farming, and to demonstrate results to be obtained thereby it would require the influx of 100 to 200 settlers, carefully selected for their proficiency in and preference for irrigation farming. These should be placed on a compact area to make a showing. Such a demonstration might bring about a change in agriculture of the region which up to the present time has not been of such character as to contribute to the return to the United States of its investment in canals or the cost of the operation of the system. Dairy stock needs improvement and the community generally lacks cheese factories, creameries, canneries, and other industries related to agriculture, although a beet-sugar factory is being erected at Chinook which will prove of benefit to many water users. No satisfactory long time or intermediate credit is available on this project. Before colonization can become active and successful it is believed this will have to be provided by some agency.

Sun River project, Montana.—Wheat is the predominant crop on the Greenfields division, with dry farming being practiced as much as possible, often to the detriment of crop production. Methods of farming should be revised, and farm areas, now aggregating in many cases 320 acres or more, should be subdivided. Many more settlers are needed in order to decrease the size of the farms and produce a change to agriculture based on production of stock and dairy products.

Lower Yellowstone project, Montana-North Dakota.—Development of irrigation has been very slow. The change from dry farming to irrigation farming is being made reluctantly and a large area of lands is still wholly fallow or not being farmed. Success in operation of the project makes imperative reduction in size of holdings. New settlers with an experience in irrigation farming are needed. A sugar factory

now in course of erection at Sidney, for its successful operation, will bring about more intensive cultivation of farms than has heretofore been the rule.

North Platte project, Nebraska-Wyoming.—Much of the project is farmed by tenants, seldom in an intensive way. Plans are needed to put tenanted lands under the operation of owners. Many ownerships should be subdivided. There is room for many settlers, but to make settlement successful, transfers of land require satisfactory prices and terms, social conditions must be favorable, marketing should be improved, and credit conditions warrant much attention both for long term and intermediate credits.

Newlands project, Nevada.—The long distances from this project to most markets and relatively high freight costs should be offset as much as possible by better marketing arrangements. Livestock on the project has been increasing, but more care is needed in selection. Many large holdings under old vested rights still exist which should be subdivided and disposed of to new settlers. Soil preparation, owing to unfavorable topography so often found, requires unusual expenditures prior to full crop production, and in obtaining settlers care should be taken to secure only settlers who are supplied with adequate capital. Local sources of capital are very limited and interest charges generally high.

Carlsbad project, New Mexico.—Cooperative institutions for marketing of crops and products are needed. The project has been found especially suited to cotton culture, and needs at least 200 settlers to permit the full development of this crop and of other intensive crops suited to the locality.

Umatilla project, Oregon.—Considerable land of extremely sandy nature should be eliminated from the project and means provided to transfer resident owners to better lands. The project has been to a large degree devoted to alfalfa production, much of which has been shipped out baled or as alfalfa meal. More livestock should be held locally to consume alfalfa production and aid in improving the lands.

Klamath project, Oregon-California.—A considerable number of large holdings of land scattered through the project require subdivision. Generally, intensive irrigated agriculture is needed. The successful development of the Tule Lake

(Continued on page 136)

THE FARM COMMUNITIES ASSOCIATION

THE Farm Communities Association, whose president is Dr. Alvin Johnson and whose general counsel is Mr. Matthew Hale, 25 Broad Street, New York, N. Y., was organized to help safeguard the national welfare of the United States by making actual working demonstrations of attractive and remunerative country life. Through its principles and purposes the work of the association is linked closely with that of the Bureau of Reclamation in its work of bringing about better economic conditions on the irrigation projects.

PRINCIPLES AND PURPOSES

Realizing that the well-being of those who produce the primary wealth of the Nation by cultivating the soil is of vital importance to the economic development of the country and the perpetuation of our national institutions, and that this desired condition can not with certainty be brought about either through private enterprise or through the unaided action of departments of our Government, the Farm Communities Association contemplates a complete cooperation with all governmental departments now inter-

ested or hereafter to be interested in the promotion of better farm life conditions and will particularly endeavor through publicity and through the usual methods of organization to awaken the public interest which will find expression through the people's representatives in Congress in measures which will make it possible for departments of the Government to function advantageously and work out the principles of successful agriculture under the supervision of Government departments and in their cooperation with States and private interests. It is believed that this purpose can be accomplished by the establishment, under certain conditions, of communities which shall be essentially agricultural in nature, but which shall also contain certain industries supplemental to agricultural activities. These communities are referred to as "farm communities."

PRINCIPLES TO GOVERN ESTABLISHMENT

The following principles will govern the establishment of farm communities by this organization:

(a) The choice in each case of a healthful location suitable for the development

of a system of intensified and diversified agriculture which will enable owners of small farms while raising their own food supplies to conduct profitable farming operations in an agreeable environment.

(b) The establishment of industries supplemental to agriculture to such an extent and under such conditions as to provide for a well-balanced and economic life without rendering the farm community less attractive or less healthful for the inhabitants.

(c) The development and scientific guidance of the farm community in such a manner as to insure the economic success of the inhabitants and at the same time to provide the fullest opportunities for intellectual development and social intercourse.

(d) The provision of ample capital for carrying out the project. The element of philanthropy will be eliminated by providing for a fair return on invested capital. All revenues of the developing corporation above fixed percentage on invested capital shall be devoted to the welfare of the community.

(e) After the success of the first farm community is assured, it is the intention of the association to give nation-wide scope to its plans by the establishment of similar farm communities throughout the country. With this in view, the association purposes to choose a truly representative group of advisers and to secure the services of the best experts available.

NEEDS OF THE PROJECTS

(Continued from page 135)

lands yet to be opened will require a carefully worked out colonization and settlement plan in which settlers should be selected, their undertakings surrounded by adequate credit, and attention given to the formation of cooperative institutions.

Belle Fourche project, South Dakota.—A change in farming methods to more intensive agriculture based on careful cultivation of higher-priced crops and raising of livestock with a breaking up of large holdings is the greatest necessity. The project is too much dependent on tenants, and lacks cooperative institutions and satisfactory sources of credit to aid in development. Means should be found of effecting change in ownership where present owners are either incapable or unwilling to develop their holdings along proper lines. About 500 experienced farmers are needed to make full development possible.

Strawberry Valley project, Utah.—More of the project lands should be devoted to higher-priced crops, such as canning

factory product and small fruits, as is being done on other irrigated lands in the same general vicinity.

Okanogan project, Washington.—Agriculturally the project is in need of better facilities for long-time credit.

Yakima project, Washington.—Land acquired through foreclosure by loan agencies and land held by nonresidents are usually farmed in a haphazard way, which should be corrected by a plan of sales to settlers based on proper land valuation and satisfactory terms of purchase.

Riverton project, Wyoming.—Long distance to railroads and the lack of local markets, except for a limited amount of feed for stock, call for the production of concentrated products of high value such as butter, cheese, eggs, meat, and honey. The project is undeveloped and in many places otherwise unattractive by reason of topography and soils of indifferent character. The lands should be settled under a carefully devised plan based on selection of settlers, adequate financial support, and a system of agriculture

suited to the conditions. Cooperative and social organizations and institutions are wholly lacking and must be provided. No doubt some experimentation with crops will be necessary before a proper solution is found, followed by demonstration on a scale adequate for the purpose.

Shoshone project, Wyoming.—The Garland division is practically all irrigated, but is in need of settlers to facilitate subdivision and to replace tenantry. On Frannie division, irrigation practice in many cases developed unexpected poor soil conditions, resulting in later abandonment of many farms. Rehabilitation must be preceded by soil improvement. A competent agriculturist should assist in this work and experimental as well as demonstration work should be financed. The difficulties of permanent settlement and profitable farming will require careful selection of settlers with advice and their activities aided to a high degree. Conditions on Willwood division are expected to parallel, though probably to a less unfavorable degree, the conditions on Frannie division. Cooperative institutions are needed throughout the project.

STRAWBERRY PRODUCTION ON THE YUMA PROJECT

Two important lessons from this development are that success is due to careful planning and working up the fertility of the soil, and that proper fertilization has produced a berry in a class by itself

By Porter J. Preston, Superintendent

IN January, 1918, S. M. Colby purchased a farm unit 7 miles northeast of Yuma, Ariz., on the reservation division of the Yuma project. The unit contained 39 irrigable acres of what is usually classed on this project as sandy land.

Mr. Colby (as many others were at that time) was imbued with the idea of making big profits from raising cotton. For three years his main crop was cotton. In 1920, when the bottom dropped out of cotton prices, he found that his crops and other assets would not take care of more than one-half of his indebtedness. He fully realized that he would not be able to make a living and meet his obligations upon this farm unit and continue to grow cotton. The soil was depleted from raising cotton and the entire place needed releveling. At this time he held a conference with his banker and discussed the problem of going into truck gardening. After a thorough discussion of the situation with the banker and impressing upon him the necessity of making a considerable investment in the upbuilding of the soil in the way of fertilizing, releveling, deep plowing, etc., the banker agreed to back him.

In the spring of 1921 Mr. Colby began releveling and fertilizing the ground by the use of barnyard manure which he

obtained from his neighbors; a vegetable crop was grown in the winter and cover crops of cowpeas in the summer. Deep and thorough plowing was practiced even upon lands that were mainly white sand. Some of the land originally had less than 2 inches of soil overlying the sand. Some commercial fertilizer was used to supplement the barnyard manure and cover crops. In the beginning commercial fertilizer was used rather sparingly, but the good results obtained from it led Mr. Colby to use more and more as time went on. At first his efforts at growing vegetables were rather discouraging for the reason that so much was undersized and not of commercial quality, but with better soil fertility these difficulties began to eliminate themselves and the quality and quantity of yield improved from year to year.

In the fall of 1922 he planted his first acre of Carolina strawberries upon ground which had received two years' application of barnyard manure and had had two cover crops of cowpeas grown upon it. The plants were put out in November. Considerable amounts were expended in releveling the land to an exact level. In 1923 a small crop of strawberries was picked, and in October of that year 2 acres more were planted upon ground that had received the same treatment as

the acre planted the previous year. In 1924 a good crop of 500 trays of 12 pint boxes per tray were picked per acre from the 3 acres. The market conditions that year were somewhat confusing, as the Yuma locality and Arizona were quarantined against California, owing to the foot-and-mouth disease that had been prevalent in that State. This gave rather an uncertain market, and it was somewhat doubtful whether the prices that were then received for the berries would be maintained in a normal year. In 1925 from these 3 acres 3,000 trays of 12 pint boxes per tray were marketed. Fifty per cent of the crop was disposed of to the local market and the other 50 per cent was shipped mainly to Bisbee and Douglas, Ariz., and New Mexico points; 75 per cent of the crop was No. 1 grade and 25 per cent No. 2. Great care was exercised in grading the berries. Prices were good during the season. The No. 1 grade berries averaged \$2 per tray and No. 2 grade \$1 per tray at Yuma. The cost of placing the berries upon the market has been rather high, as proper and experienced help was not available. Considerable of the help obtained for the past two years consisted of local people, and as this help will be available in the future it is anticipated that

(Continued on page 138)



Strawberries grown on the Yuma project, Arizona-California

COMMENTS ON THE ECONOMIC REPORT

THE recent report, prepared under the direction of Commissioner Elwood Mead, on the economic feasibility of seven proposed irrigation projects in the West, has been distributed to a carefully selected list of persons who, it was believed, would be especially interested in the discussion of the economic problems involved. A large number of replies have been received commenting on the report, and from these the following are selected as typifying the reactions of those who have evidently given thoughtful consideration to the questions discussed:

"A report of this nature can not help but clarify the general situation in regard to reclamation matters and tend to put it on a sound basis which all thoughtful people can approve."—*A State engineer.*

"The variety of phases covered in your investigations and methods adopted were interesting to me, and I can offer only commendation upon the manner in which you have reduced your report into the intensely practical returns that might be expected from the expenditure of Government funds."—*A director of public works.*

"Your report impresses me as being very complete and contains information

that will be invaluable."—*A secretary of a chamber of commerce.*

"The report is an excellent piece of work, well presented."—*A city water engineer.*

"It is a very valuable compilation, containing as it does facts relative to projects which are the subject of much discussion in Congress."—*A Member of Congress.*

"I wish to commend the form and vigorous treatment adopted, and also to concur with the conclusions expressed on such of the enterprises as I know personally."—*A public roads engineer.*

"I know I shall gain much of very great value from this report to assist us in our work in this Territory."—*A Territorial Governor.*

"I congratulate you on the completeness of these reports and the broad manner in which they have been compiled, so different from the former haphazard method of going ahead with their construction and then expecting the farmer to work out his own salvation with indifferent aid and encouragement."—*A well-known economist.*

"I believe in supervised and directed development, and consider the reports most valuable."—*A railroad official.*

"One important fact which this report brings out is that there is a great deal more to the matter of successful reclamation through irrigation than mere engineering. That is a point which I think has not been fully understood, especially by engineers in the East. I am very much pleased to note that the other features of the matter are receiving such careful and adequate attention even though I as an engineer am naturally inclined to stress the importance of the engineering features of the subject."—*A hydraulic engineer.*

"Your present plan of submitting a report on the economics of the project with the other data necessary should do away with any future criticism that the officials of the bureau have in past times been overenthusiastic, and have reclaimed some land at too great a cost, all things considered; it being assumed of course that the economic report is written by seekers after facts, and not by enthusiasts. This feature of the reports I think can not be too highly commended."—*A professor of engineering.*

"The report contains considerable valuable information, much of which can be used in this department at the

present time in comparison of irrigation districts."—*A commissioner of public lands.*

"The report is an extremely interesting compilation of facts and figures."—*A general manager of a chamber of commerce.*

"I have gone over the report sufficiently to know that you have made a very comprehensive study of these proposed projects. I am confident that the information contained in this report will prove to be extremely useful and helpful to us in the development of our work in the Department of Economics and Sociology in this institution."—*A professor of economics and sociology.*

"You have made a most favorable contribution to the reclamation program. It is frank statements and clean-cut opinion based upon careful survey that should bring about the right type of Federal aid and assistance in the promotion of the logical and worthwhile projects."—*A secretary of a chamber of commerce.*

"I have perused the report with much interest, marveling how you managed to get so many individual bankers, business men, farmers, educationalists, and others to cooperate with you. The information collected is just what is needed."—*An eminent Australian civil engineer.*

SECRETARY'S DECISION NOT TO BE OVERTURNED

Before the construction of the Salt River project, Arizona, owners of lands who desired water for irrigation formed a corporation known as the Salt River Valley Water Users' Association, and subscribed for stock for an area in excess of that susceptible of irrigation from the existing water supply. The stock subscription contracts and articles of incorporation of the association left it to the Government to determine the extent of the available water supply. Plaintiffs had subscribed for stock in the association, but on account of the Secretary's determination, their land was deprived of water when the boundaries of the irrigable area of the project were fixed in the Secretary's public notice under the reclamation act. Plaintiffs sought to secure by court action a reversal of the Secretary's findings, so far as their land was concerned. It was held: "In such a case certainly a court may not substitute its judgment on those points for that of the Secretary, but his decision as to available water, and land to be included in the project, stands until he modifies it himself." (*Salt River Valley Water Users' Association v. Spicer*, May 26, 1925, 236 Pac. 728.)

YUMA STRAWBERRIES

(Continued from page 137)

it will be much more efficient as they become more experienced, thus reducing the cost of placing the product upon the market.

Mr. Colby is putting out 4 acres additional this coming fall and anticipates no difficulties in the marketing situation, as during the past season the demands for his berries were more than double what he could furnish.

The writer has been familiar with this development and its progress from the beginning. Two very important lessons stand out in this development that should be emphasized. The first is that Mr. Colby's success is not due to accident but to careful planning several years in advance and working up the fertility of the soil to a point where quantity production is obtained; and, second, that proper fertilization has produced a berry which stands in a class by itself. His No. 1 grade strawberries are of excellent quality, and when the quality is produced there is an ample market for it at good prices with very little competition.

CONSTRUCTION OF MCKAY DAM, UMATILLA PROJECT

It is expected that all features of the dam, which was begun in July, 1923, will be completed by the fall of 1926, and that water may be stored for the irrigation season of 1927

By Ralph Lowry, Resident Engineer

THE McKay Dam which is being constructed by the Bureau of Reclamation is located on McKay Creek about 5 miles above the confluence of the creek with the Umatilla River and 7 miles south of the town of Pendleton, Oreg. The dam when completed will create a reservoir about 4 miles long and a mile wide having a storage capacity of 73,000 acre-feet. The stored water will be used in supplementing the natural flow of the Umatilla River for the irrigation of some 38,000 acres of land, now partially developed, and located along the river in the vicinity of the towns of Echo, Stanfield, and Hermiston. The construction work on the dam, which started in July, 1923, is being done by Government forces and consists essentially of three main features, namely, the gravel fill, spillway, and outlet tunnel.

THE GRAVEL FILL

The gravel fill has a top length of 2,700 feet, a maximum height above the creek channel of 165 feet, a 2 to 1 downstream slope, a $1\frac{3}{4}$ to 1 upstream slope, and will contain when completed 2,300,000 cubic yards of embankment material. The material for making the fill consists of a well-graded gravel containing a varying content of earth and sand. It is secured from the valley floor upstream from the dam site where, after being wetted, it is excavated with two 80-B electrically-operated Bucyrus shovels, loaded into 4-yard dump cars, and hauled with 18 and 20 ton dinkey locomotives, an average of $1\frac{1}{2}$ miles to the dam. After reaching the dam the material is dumped in longitudi-

nal rows spread to a thickness not exceeding 8 inches with horse-drawn grading machines and compacted by rolling with traction engines.

Work on placing the gravel fill started in February, 1924, and continuous operation has been maintained since that date with the exception of about one month during the winter of 1924-25. One million seven hundred thousand cubic yards of embankment material had been placed to July 1. The maximum quantity placed during any one month was 166,000 cubic yards and the maximum daily run was 8,000 cubic yards; in each case two shifts of eight hours each were employed. In addition to the two electric shovels, the principal items of equipment used in making the fill consist of 11 dinkey locomotives, 120 4-yard dump cars, 5 traction engines, and 3 grading machines.

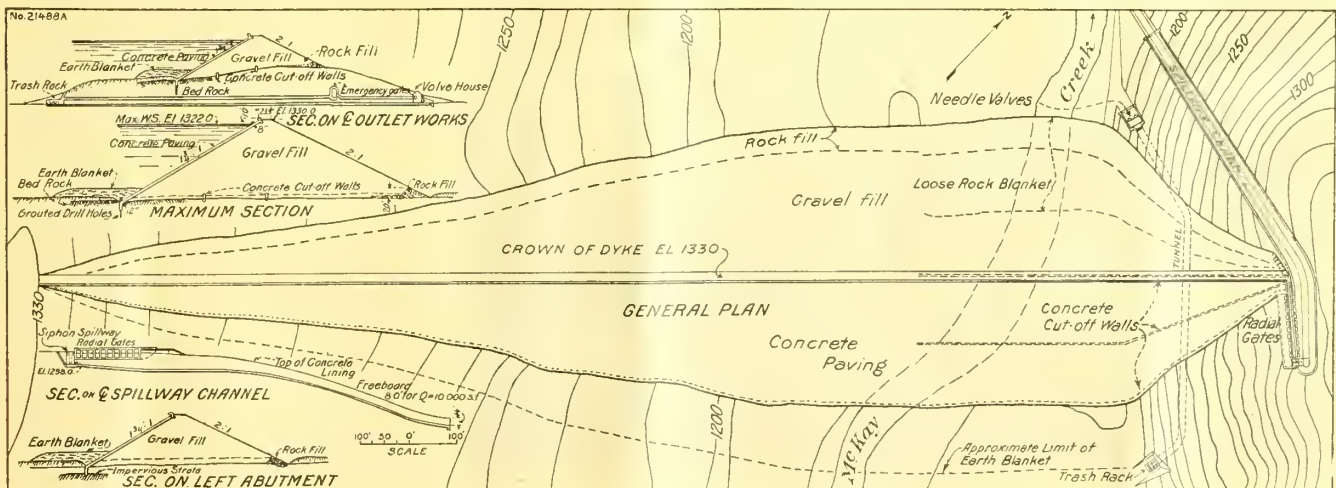
The $1\frac{3}{4}$ to 1 upstream slope of the gravel fill is to be entirely covered by a layer of continuous concrete, which totals about 16,000 cubic yards, all of which is to be reinforced with $\frac{3}{4}$ -inch round rods spaced 18 inches centers both ways. The thickness of the concrete face varies uniformly from $12\frac{1}{2}$ inches at the upstream toe of the fill to 8 inches at the parapet wall on top of the dam. The concrete face terminates in a concrete cut-off wall, which is located along the upstream toe for the full length of the dam. The cut-off wall is placed in a trench which had been excavated in the lava rock foundation. Grout holes were put down into the lava rock from the bottom of the trench to a maximum depth of 45 feet by using a model 21 Turbro drill mounted on

a derrick. The holes were spaced at intervals not exceeding 10-foot centers and in places were spaced as closely as 3-foot centers. Cement grout was forced into the holes by air under a pressure which did not exceed 100 pounds per square inch. Work was started in the fall of 1923 on both the upstream cut-off wall and the grouting, and has been carried on almost continuously since then, during which time 1,600 cubic yards of concrete have been placed in the trench and 10,000 linear feet of grout holes have been drilled and grouted. Before any work could be done on the gravel fill it was necessary to strip the top soil down to compact gravel or solid rock over the greater part of the left abutment and across the valley floor. This work was started in July, 1923, and was done with fresnoes and dump wagons, the latter being loaded by an Austin dragline equipped with a one-half yard bucket. All top soil was removed from the base of the dam and deposited near the upstream toe where it will later be spread into an earth blanket. Stripping operations resulted in the removal of 160,000 cubic yards of top soil.

THE SPILLWAY

The spillway is located in the lava rock of the right abutment at the end of the gravel fill. It is of the side-channel type, the channel being lined with concrete. Flow into the spillway channel is controlled by a concrete gate structure containing six 20 by 10 foot radial gates and a two-barrel siphon spillway. The spillway is designed to pass 10,000 second

(Continued on page 140)



McKAY DAM CONSTRUCTION

(Continued from page 139)

feet, in addition to which a liberal allowance for freeboard is made. Of the 31,000 cubic yards of rock to be excavated from the spillway channel 29,000 have been removed. The rock is drilled with jack hammers, shot, and moved down the spillway channel to its lower end by means of power-operated drag buckets. At the lower end of the channel it is loaded by gravity in 4-yard dump cars and placed in the downstream toe drain of the embankment. Present designs call for placing 3,000 cubic yards of concrete to complete the spillway structure.

THE OUTLET TUNNEL

The outlet tunnel has been driven through the lava rock under the right abutment of the dam. The tunnel will serve a double purpose. It is being used now to divert the natural flow of McKay Creek around the embankment while the latter is under construction. After the dam is completed and the tunnel is equipped with the necessary gates and apparatus it will be used for controlling the release of the irrigation draft from the reservoir. The tunnel is 705 feet long, and is lined with concrete for its full length. The release of the irrigation draft will be effected by the use of two sets of gates, one set of two emergency gates, and one set of two balanced needle valves.

The emergency gates which cover 4 by 4 foot openings are located in the tunnel 550 feet from the intake portal. These gates are the plain sliding type, piston operated with oil under pressure. The emergency gates are not to be operated

at partial openings but are to be used primarily for inspection and repairs to the balanced needle valves. The valves which are 48 inches in diameter are located at the outlet portal of the tunnel and each of the two valves is connected to its emergency gate by means of a steel pipe 54 inches in diameter. The portion of the tunnel from the emergency gate chamber to the intake portal is a 10-foot diameter horseshoe section. This portion of the tunnel will be under reservoir pressure and has been thoroughly grouted. The portion of the tunnel from the emergency gate chamber to the outlet portal will be open and through it access will be had to the operating chamber of the emergency gates.

The tunnel was driven from both portals. Work was under way in good shape by the middle of October, 1923, and the tunnel was holed through on December 22. It was driven through rock which varied from a hard blue basalt to the softer forms of lava. No unusual difficulties were encountered in driving the tunnel and it was not necessary to timber. Air for drilling was furnished by a 13 by 14 inch Laidlaw compressor driven by a 75-horsepower motor. The rock excavated in the tunnel was placed in the downstream toe drain of the embankment.

A connected electric load of about 500 horsepower is maintained in operating the equipment including the 80-B shovels, machinery in the shop, compressor, a hoist at the spillway, and several pumps. Part of the load is used for lighting the camp and the work. The electric power

is purchased from the Pacific Power & Light Co. The dinkey locomotives and four of the traction engines are fired with crude oil.

A plentiful supply of labor has been available since the work started and a maximum force of 300 men has been employed.

Gravel for concrete is obtained in the borrow pits above the dam. Owing to the large number of cobbles and the considerable amount of dirt encountered, the pit run material is put through a crusher and thoroughly washed before screening. The sand is obtained from natural deposits near Hermiston, Oreg., from where it is shipped by rail a distance of 42 miles to Sparks station and is then hauled by truck $2\frac{1}{2}$ miles to the dam.

Present progress indicates that all features of the McKay Dam work will be completed by the fall of 1926 and that water may be stored for the irrigation season of 1927.

THE VIEWPOINT OF A SUCCESSFUL FARMER

The following letter was received by Secretary Work on July 21, 1925:

"I wish to congratulate you on your announced policy toward future irrigation projects as reported in AP dispatches from Washington this morning. The utter folly of throwing more money away on unnecessary irrigation projects should stop. It is not the actual farmer who is in such a hurry to reclaim all the desert land in the United States at the public expense, nor is it the citizen who wants the land for a home. The latter can find plenty of that now at nominal cost. The people who are pushing so insistently for more reclamation projects are the boosters, the boomers, and the grafters who are hoping and planning to skim easy profits by hook or crook through the expenditure of huge sums of Government money. This gentry would not go on this land themselves—not on your life. They are looking for easy money.

"I have lived upon and farmed a 40-acre tract for 31 years. I grubbed the sage brush off with my own hands, and know all about the trials of the pioneer. I have a beautiful place, and would welcome the time when all our section of the State could be equally well improved but I recognize the futility of attempting it at the present time."



McKay dam under construction

HELPING MEN OWN FARMS IN ENGLAND

IN the Saturday Evening Post for August 15 an interesting article by Will Payne, entitled "An English Farmer," describes some of the experiences of the Government of Great Britain in helping men own farms which has a direct bearing on the problems of the Federal Reclamation Service.

In 1907 the British Parliament, moved by the continued decline in the number of farmers on the land and in the home production of breadstuffs, sought by legislation to increase the number of family farms which would be owned and mainly worked by the occupant and his family. One reason for this legislation was the success which had attended the movement in Ireland to replace the discontented and rebellious tenant with the small-farm owner. It was pointed out also by those who favored this movement that while agriculture in England was declining, it flourished in other countries where the typical tiller of the soil was its owner.

The act passed by Parliament in 1907—"empowered county councils to acquire land compulsorily for the purpose of allotting it in small holdings to actual tillers. They might also purchase or lease land by agreement with the owner and resell or lease it to actual cultivators. Having acquired the land, they were further empowered to adopt it to small holdings by erecting dwellings and barns, fencing it, draining it, etc. The necessary money was to be raised by bond issues, and the national government agreed to reimburse the councils for half of any loss they might incur in these operations. Also if any conservative county council refused or neglected to participate in the scheme, the national government might take the matter into its own hands by transferring the local powers of such recalcitrant council to a small-holdings commission, which would buy or lease the land, improve it with buildings where necessary, and resell or lease it to small holders."

THE SMALL-HOLDINGS ACT

"But the act provided that the purchaser should pay down, on taking possession, at least one-fifth of the purchase price, the remainder to be paid in installments over a long period. Also it set forth that the land was to be sold or leased to small holders on terms which, in the judgment of the county councils or the small-holdings commission, would cover the cost to the taxpayers. Thus, as a parliamentary report observes, 'the principle un-

derlying the act is often described as the self-supporting principle.'"

Between 1907 and the Great War 189,294 acres of land had been purchased in England and Wales and parceled out among 13,381 small holders and actual cultivators. As this was controlled by county councils the results were not always the same, but the total cost to the government was about \$10 an acre, and this was mainly due to the necessity for purchasing the costly homes and out-buildings of large land owners, which could not be utilized or sold for the amount paid for them. This loss also includes interest, which was charged and would not exceed two years' interest. If money had been furnished without interest, as is done by the Federal Government on reclamation projects in this country, the results would have shown a gain rather than loss.

The war interrupted this movement. After the close it was resumed, but with a fundamental change in its objective and under far more difficult conditions. Before the war the movement was to help qualified cultivators become land owners, but after the war the primary object was to provide farms for soldiers, and the earlier safeguards which made the movement self-supporting, were discarded. The old act required the purchaser to have some capital, as he had to pay one-fifth of the cost in cash. He also had to show a knowledge of farm practice and some farm experience.

Under the new act they are not required to pay anything down—repayment of the

whole purchase price being spread over 50 years. The new act also authorizes county councils to make loans to small-holdings purchasers or lessees for the purpose of buying livestock, fruit trees, seeds, fertilizers, and implements. And for the encouragement of the councils, the national exchequer undertakes to shoulder all the loss. But the new act requires that in allotting small holdings preference shall be given to ex-service men. In fact, it has been operated almost entirely for their benefit.

The development of farms after the war was far more expensive than under the earlier movement. Exorbitant prices had to be paid for labor and for the material which went into farm homes, so that on some of the farms the improvements alone cost as high as \$9,000. The result of this second movement has been a heavy loss, amounting probably to \$39,000,000, which will fall on the Government. In other words, aid in settlement where it was based on requiring the settler to have some capital of his own to underwrite that furnished by the Government, and requiring him to have a knowledge of farming, was a success. Where these safeguards were ignored, it became a costly failure.

The reclamation development of this country was started with the idea that settlers could be accepted without capital or farming experience. It is now recognized as unworkable under existing conditions. The earlier attempts of Great Britain seem to throw some light on the policy which should be adopted here in the future extension of the reclaimed areas.

Fruit is not so plentiful in eastern districts, but the Pacific coast will make good much of the deficiency.



Threshing on the North Platte project, Nebraska-Wyoming

LOWER RIO GRANDE DELEGATION VISITS PROJECT

Party of forty-six irrigationists pays visit to Rio Grande project and is impressed with cordial spirit of cooperation between Government officials and water users

By C. H. Pease, Secretary Lower Rio Grande Valley Water Users' Association

A PARTY of 46 Lower Rio Grande Valley citizens, traveling overland in a caravan of 15 automobiles, recently paid a visit to the Rio Grande project and the Elephant Butte Dam. The purpose behind this trip was to find out what the actual conditions were on an irrigation system which had been built by the Government and was being operated by the Bureau of Reclamation.

The Lower Rio Grande Valley, where the caravan originated, is an exceedingly rich and productive section which has been developed entirely by private enterprise. There are 15 entirely independent irrigation systems, each having a checkered history of its own. Ten of these are now controlled by irrigation districts. The source of water supply is the normal flow of the Rio Grande lifted by means of pumping plants into the main distributing canals. In some instances a second lift is necessary to reach the main project lands. The total lift varies from 12 to 50 feet, and the cost of irrigation varies from \$6 to as high as \$12 or \$15 an acre per year.

The desirability of securing a more economical system of irrigation and of increasing the water supply by storage has been recognized, and some years ago the Bureau of Reclamation was employed to make a study of the physical conditions and make recommendations. The result was the outlining by the Government engineers of a system of storage and gravity diversions which has been the subject of much discussion and some controversy among valley interests ever since.

The announcement by the Gravity Irrigation News of a caravan to visit the proposed storage sites in the Big Bend region of the Rio Grande and to inspect the Government project at El Paso attracted immediate interest. But for the fact that the cotton-picking season came on three weeks earlier than normal this year there would have been at least 100 automobiles in the party, but as it was the party was sufficiently representative to cover practically every valley community.

The visit to the Mariscal and Boquillas Canyons in the Big Bend, located far from the beaten path, and in a region difficult of access, was an arduous feat, but in spite of the difficulties, men, women, and children braved the heat and the barren rocks and climbed to vantage points where the best views could be had. The

conviction was general that the Government men had located ideal sites for great storage dams.

The party reached El Paso after being 10 days out. Here they were welcomed by Mr. Bandeen, of the chamber of commerce, by Mr. Roland Harwell, of the El Paso irrigation district, and by L. M. Lawson, superintendent of the Rio Grande project. The following day they were tendered a luncheon by the chamber of commerce, and among the speakers present were the presidents of the two irrigation districts, representatives of the El Paso and Las Cruces Chambers of Commerce, Major Richard Burgess, who was intimately associated with the creation of the Rio Grande project and is a well-known authority on irrigation law, and Mr. Lawson, superintendent of the project.

Here in one gathering were representatives of the commercial interests, of the farmers, and of the Government, as well as a widely known irrigation attorney. Certainly no finer opportunity could be had to secure first hand and authoritative information. The members of the party took advantage of the opportunity and asked numerous questions which were answered with perfect frankness.

One of the things that impressed the visitors was the splendid relations that seemed to exist between the Government men and the farmers. Everyone present was emphatic in the statement that while there were occasional differences of opinion as to methods and policies, these differences were thrashed out in conference and the final action was the resultant of the agreement that followed such conferences. No evidences of antagonism or friction could be found. Another point that was brought out was the economy and efficiency of Government work and construction on this project. The presidents of both districts agreed that the construction work that had been done on the project had been well done, and had been done at a cost lower than private contractors would attempt it. The cheapness of the water service simply astonished the valley men. They could not understand how a whole season's water supply could be provided for a cost as low as \$2.27 a year, which was given as the average cost of water the past season to the farmers.

Following the luncheon, the caravan lined up and was escorted to the International Dam, where a demonstration of

the operation of the desilting basin was witnessed. This was of great interest, as the silt problem is the source of a great deal of expense to valley irrigators. The drive continued to the Mesilla dam, passing through the irrigated farms of the Mesilla Valley en route. Splendid crops of cotton, melons, and other truck crops were to be seen. The caravan camped at the beautiful camp ground adjoining the dam. That evening the members enjoyed the visual demonstration of gravity irrigation as they saw the rushing waters diverted through the gates into the two canals heading at this dam, and learned that the total expense of operating this dam was but \$120 a month.

Through the courtesy of Doctor Kent, president of the Agricultural and Mechanical College of New Mexico, and Professor Garcia, director of the New Mexico Experiment Station, the visitors were shown the college and the demonstration plots at the experiment station, which was greatly enjoyed. There was an informal reception the next forenoon tendered by the Las Cruces Chamber of Commerce at their headquarters in Las Cruces. Then the party, led by Mr. Lawson and Mr. Taylor, president of the irrigation district, started for the Elephant Butte Dam. The Leesburg diversion dam was visited on the way. Late in the afternoon the big dam was reached. Each member of the party was furnished with a room at the Government hotel, which was a welcome relief from camp life. Meals were furnished at the Government mess hall by the two irrigation districts and the Dona Ana Farm Bureau.

These meals constitute one of the bright spots of the trip, for the elaborate menu was in marked contrast with the necessarily limited fare of our camp meals. Notwithstanding the lively appetites which we had developed, we were unable to consume all the food that had been prepared for us.

On the evening of our arrival at the dam we all went down to inspect it. Led by Mr. Lawson, the descent down the long stairway into the interior of the structure was made. As we went down, down, down, the thunder of the waters being released through the enormous valves became louder and louder until conversation became difficult. The electrical mechanism that operates the valves was explained to us. The tremendous

magnitude of this man-made structure was truly impressive. Emerging from the interior through a long hallway we found ourselves at the foot of the dam. At our feet the tumultuous waters were being discharged under a pressure that was awe inspiring. Looking upward far above our heads the beautiful and harmonious lines of the wonderful structure were outlined by rows of electric lights against the starry sky. We stood for a moment in silence, trying to grasp the full significance of this scene. We were assured that for many miles above, the bed of the Rio Grande, source of the water supply, was a mere expanse of barren sand. No

water had been seen in it for months. Yet here was a lake of water held in leash by the big dam, sufficient to feed the raging torrent at our feet for months without perceptible diminution. The waters now being drawn upon were the same that had swept down the valley above over a year ago, and but for the dam before us would have left devastation in its path in the populous communities below. The waters which were bent on destruction last year are this year put to work to produce abundant crops in a valley that would otherwise have burned up with drought.

Our people looked with a feeling of

intense admiration on the stately structure before them. They acknowledged a feeling of respect for the men who could design and build such a work which could thus curb the forces of nature and bend them to serve mankind. They also formed a firm determination to never cease effort until the remainder of the Rio Grande which lies below this dam shall have a similar control placed over it, to the end that the people of the Lower Rio Grande Valley may be the masters rather than the slaves of the river on which they must needs depend for the maintenance of the communities which they have founded there.

ELEPHANT BUTTE DISTRICT TO YIELD \$7,000,000 THIS YEAR

THE New Mexican, of Santa Fe, reports that the Elephant Butte irrigated district of New Mexico, through diversified farming, with two or three great money crops, will yield farm products worth more than \$7,000,000 this year.

These figures are based upon reports of returns already received and upon careful estimates of the returns that will be obtained from crops that are yet to be harvested and marketed.

With all crops in splendid condition, including fruit, cotton, alfalfa, cantaloupes and other truck crops, and with a steadily growing output of dairy and poultry products, the Elephant Butte district promises to surpass its record-breaking production of 1924, pushing the average value of its products per acre well above the \$100 mark. Last year, according to the census of the Bureau of Reclamation, the average value of farm products of the Elephant Butte project was \$97.20 an acre, not including the big item of livestock, and dairy and poultry products.

Last year there was practically no fruit, owing to the usually late frost, but this year the valley has one of the greatest fruit crops in its history. At the same time the returns from all other crops promise to be as great or greater than those of last year, which will bring the average production per cultivated acre up to a figure considerably in excess of that of 1924.

With probable greater returns per acre and with an increase of approximately 14,000 acres in the cultivated area in the district, the estimate of a \$7,000,000 farm crop seems to be conservative.

While cotton will again be the greatest money crop of the district, the record of returns from other crops and farm products and the increased acreage in many

crops other than cotton show wide diversification.

Cotton, alfalfa, cantaloupes, and dairy products will account for the greater part of the district's \$7,000,000 crops this year, but the total will include returns of considerable magnitude from fruit, poultry products, and a great variety of truck crops, such as sweet potatoes, spinach, beans, chili, and asparagus.

This year's returns from some of the district's important crops are estimated as follows:

Cotton and cottonseed.....	\$4,000,000
Alfalfa.....	1,000,000
Cantaloupes.....	1,000,000
Dairy products.....	1,000,000
Poultry products.....	100,000

Apples.....	\$100,000
Pears.....	25,000
Wheat.....	50,000
Forage crops.....	35,000
Oats and barley.....	20,000
Grapes.....	220,000
Corn.....	100,000
Sweet potatoes.....	50,000
Peaches.....	10,000
Spinach.....	25,000
Beans.....	15,000
Asparagus.....	14,000
Chili.....	12,000
Radishes.....	4,000
Cabbage.....	14,000
Onions.....	20,000
Other truck crops.....	30,000

Total..... 7,844,000

In many cases the figures given above include only the value of products shipped outside the district and do not take into consideration products sold or consumed at home. Figures are not available on the returns from many smaller crops, such as strawberries, blueberries, artichokes, rhubarb, Irish potatoes, watermelons, squash, apricots, quinces, and other fruits.



A 3-year-old pear orchard on the Rio Grande project, New Mexico-Texas



A money making side line on the Rio Grande project, New Mexico-Texas

LIMIT OF IRRIGATED AREA IN CALIFORNIA

The value of soil products in California in 1924 was approximately \$450,000,000. This included the production of both irrigated and unirrigated land and included 6,000,000 acres of the former. Although agriculturists have thus far skimmed the cream of the land that may be used for irrigation there is an ultimate limit to the total amount of land in the State for which there will be sufficient irrigation water. Various estimates place this total area from 12 to 18 million acres, which it is estimated should produce a crop worth at present price levels about one billion dollars. The development of water for irrigation purposes is becoming increasingly expensive and the cost of development per acre is already so high that it is usually feasible to develop only in comparatively large tracts—a fact which is believed to increase the probability that either State or Federal aid will be needed in much of the development work yet to be done.—Engineering News-Record.

Potatoes are a decidedly smaller acreage than last year and promise a smaller yield, but nevertheless may make more money for producers.

YAKIMA PROJECT FRUIT TOPS FOREIGN MARKET

Recent press dispatches state that J. MacPhee Ferguson, of Yakima, Wash., recently topped the Scotland apple market with a carload of wine-sap apples harvested in 1924. Despite the fact that the apples were nearly a year old and had been shipped 8,000 miles by rail and water, they arrived in first-class condition and brought prices four times more than this year's crop of Portuguese apples and higher than the 1925 crop of Australian and New Zealand apples.

THE WATER SUPPLY OF THE PROJECTS

An unusual amount of summer rains throughout the West has improved water supply conditions so that there is now no apparent danger of further shortage of water on any project excepting only the Okanogan project, and conditions there are much improved over those of 1924. Carlsbad project will have an ample supply for the rest of the season, although it suffered considerable damage from a scanty supply prior to July.

RECLAMATION FUND HELPED BY SALES

The reclamation fund was increased \$158,429.53 through receipts from the sale of public lands including fees and commissions for the quarter ended June 30, 1925, the Interior Department announced to-day.

A list of the States with proceeds from the sale of public lands credited to the reclamation fund follows:

Arizona.....	\$12, 025. 49
California.....	22, 500. 79
Colorado.....	17, 889. 11
Idaho.....	9, 923. 88
Kansas.....	34. 24
Montana.....	13, 489. 40
Nebraska.....	4, 668. 12
Nevada.....	5, 917. 21
New Mexico.....	19, 756. 41
North Dakota.....	581. 27
Oklahoma.....	1, 024. 74
Oregon.....	12, 501. 45
South Dakota.....	2, 559. 81
Utah.....	8, 178. 19
Washington.....	4, 463. 36
Wyoming.....	22, 916. 06

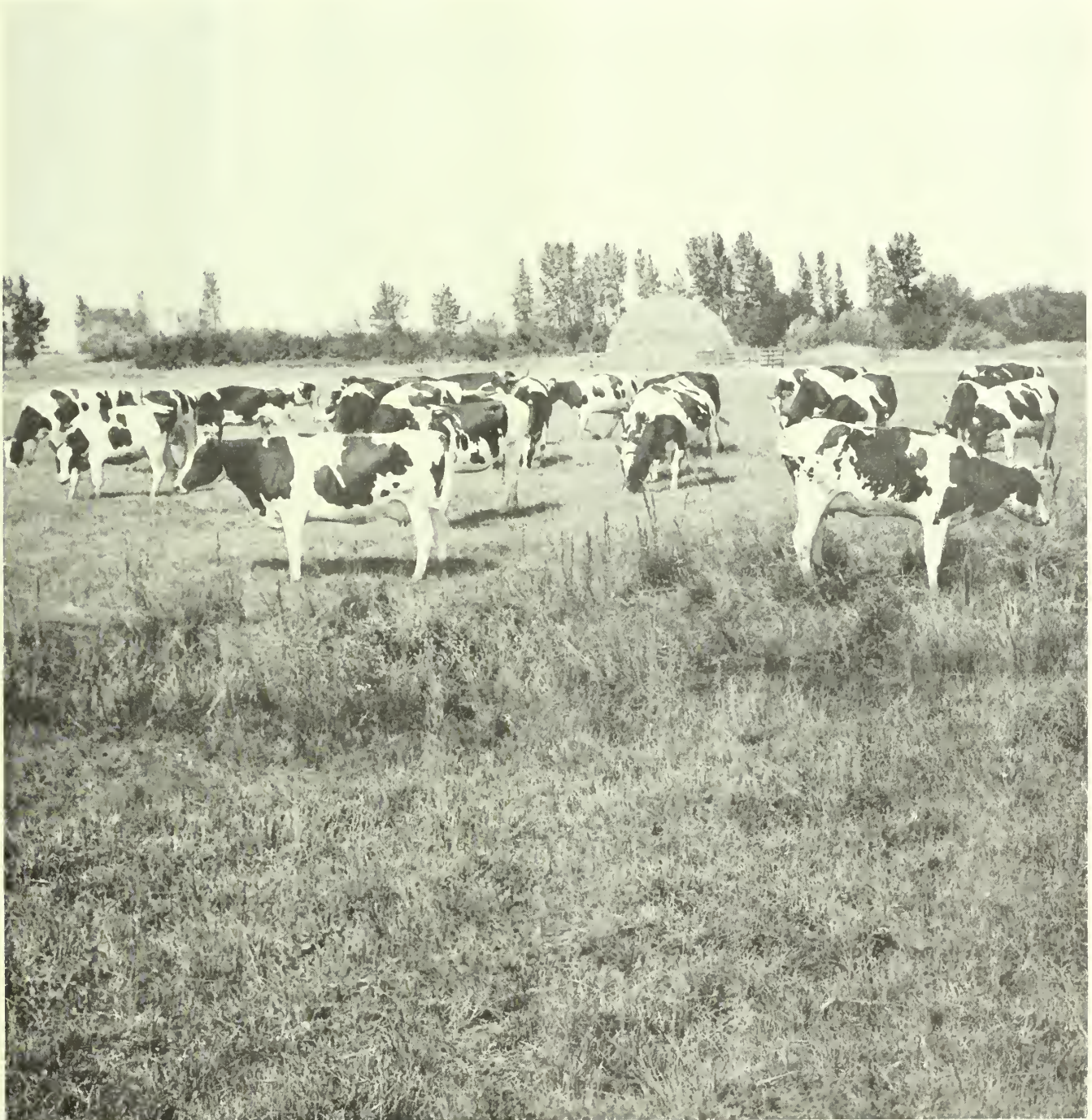
The terms of the reclamation law passed in 1902 provide that a part of the proceeds from the sale of public lands shall be credited to the reclamation fund for the construction and maintenance of irrigation projects by the Government.

NEW RECLAMATION ERA

VOL. 16

OCTOBER, 1925

NO. 10



HERDS OF PURE-BRED DAIRY CATTLE INDICATE PROSPEROUS CONDITIONS

FEASIBILITY

FEASIBILITY means "fit to be used or dealt with successfully." When applied to Federal reclamation of arid lands it refers both to the project's physical features and its economic promise.

The project surface may be so rough that the cost of leveling may be prohibitive, so steep that water will not lie on it, or so depressed that it can not be drained. Irrigation under either of these conditions is not feasible.

The soil must be fertile and the growing season long enough to mature profitable crops.

The relation between the estimated cost of supplying water and the returns which can be had from its use in irrigation likewise affect feasibility. The value of the crop should pay production expenses, give an adequate reward for labor, and in addition pay for the reclamation works.

The time required to return funds advanced by the Government in the improvement of lands is also an essential factor in determining feasibility. The investment should be repaid in a reasonable time. This in Federal reclamation should not exceed 40 years.

The cost of land, expenses of improving and equipping farms, availability of stable markets and fair prices, and the health and social conditions of the locality affect the economic opportunities and contentment of the irrigator and his family, and are therefore features of feasibility.

And finally, suitable settlers must be found for the project; otherwise it will not prove to be feasible under any circumstances.

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

OCTOBER, 1925

No. 10

HIGH LIGHTS IN A REVIEW OF THE MONTH

THE Orland project, California, voted overwhelmingly for the construction of the Stony Gorge reservoir to increase the water supply on the project. Of the 796 ballots issued, 687 were returned. Of these, 660 were in favor of the work, 25 against, and 2 ballots were rejected. Of the 25 negative ballots all but 2 were cast by nonresident land owners, indicating an almost universal sentiment among resident property owners in favor of the proposed reservoir.

SIGNED by more than 600 water users and representing 35,000 acres of land under the Boise project, Idaho, petitions have been filed with the county commissioners requesting the calling of an election to vote upon the proposal to organize the lands of the project into an irrigation district. The proposed district will include all of the lands in Canyon County not now within irrigation districts already formed.

ACCORDING to a memorandum decision handed down by Federal Judge F. S. Dietrich in connection with the payment of drainage charges on the Boise project, Idaho, Government officials may shut off water to settlers who are delinquent in their payments.

PLANs are under way for the organization of a finance corporation, patterned after the Montana Livestock Loan Corporation, to give aid to responsible farmers on the Sun River project, Montana. It is believed that a capital of \$50,000 will be ample. Operations will probably be carried on through the medium of the intermediate credit bank.

SHIPMENTS of fruit and other agricultural products from the Yakima Valley, Wash., up to August 28 comprised 3,899 cars as compared with 2,104 cars for the season of 1924, or an

increase of 1,795 cars. The value of products shipped from the valley during the first 28 days of August was \$3,800,000 on board cars. Of this amount 981 mixed car lots of fruit were valued at \$1,470,000; 575 cars of peaches at \$632,000; and 430 cars of grain at \$516,000.

ABOUT \$3,000,000 was added to the wealth of the country by the Salt River Valley's 1925 cantaloupe crop. This came from an area of only 5,600 acres, giving a gross return of about \$550 per acre.

TWO tons of butter leave the Yakima post office via parcel post every day, according to the Yakima Valley Progress. There is also a weekly average of 2,000 boxes of fruit and vegetables. The butter is frozen hard for shipment before leaving the creameries, and is immediately transferred from the post office to a storage car, packed for shipment in 70-pound lots. Valley brands are fast becoming well and favorably known on the coast.

LOCAL automobile dealers on the Yakima project were jubilant over the business prospects for the coming season, and reported August sales 100 per cent above those of the same period last year.

THE early potato harvest on the Grand Valley project had been completed with very satisfactory returns, the price holding at about \$2 per hundredweight. About 400 cars of peaches had been shipped from the Palisade district. Prices were satisfactory and many growers received more than \$1,000 an acre.

ON the Milk River project the second cutting of alfalfa had been completed. There will be a considerable acreage in alfalfa seed this year. Beet fields were in excellent condition and sugar

company officials were well satisfied with the prospects for this crop.

THRESHING of small grain on the Belle Fourche project was about 80 per cent completed, and returns were fully up to expectations. Corn made fine progress, and sugar beets promised a bumper yield. Additional tanks were being erected to take care of the large cucumber pickle crop. This industry gives excellent promise of providing ready cash and large returns on a small acreage.

EARLY potatoes were being harvested on the Shoshone project, and the first 10 carloads brought the growers \$1.75 per hundredweight. Yields were excellent and growers of this crop had the best season since the war. Returns on small grains were better than at any time since 1919.

AT American Falls Dam concreting on the gate section within the present cofferdam was completed to elevation 4,300 and work was begun on the left penstock section. The steel gate frames for the left penstock openings were placed. Excavation continued for the core wall of the right embankment and on placing and rolling embankment material.

AT Guernsey Dam excavation of the diversion tunnel continued for 219 linear feet, the total excavation amounting to 4,483 cubic yards. Work was continued on the trenches for the cut-off walls and on the north side spillway.

AT McKay Dam excavation of rock from the spillway channel and for the spillway gate structures was continued. One hundred and thirty-two thousand cubic yards of gravel embankment were placed at a unit cost of 50 cents, the total to the end of the month amounting to 1,960,000 cubic yards at a unit cost of 42 cents.

SECRETARY AND COMMISSIONER GET FIRST-HAND DATA

Extended visit affords personal knowledge of economic conditions on projects where works are being built to reclaim new areas and where appropriations have been made for beginning such works

(Continued from September issue)

ON July 10 the merits of the Owyhee project were presented at a morning meeting in Ontario. The leading feature was a clear statement of the situation from the local standpoint by E. C. Van Petten. Some of the facts presented in Mr. Van Petten's paper are printed in this issue.

The meeting at Ontario had to be brief because of a promise made to Senator Gooding and Congressman French of Idaho that an inspection would be made of the Washington irrigation district near Weiser. The irrigation works of this district were built from the proceeds of two sales of district bonds. Payment of interest on the district's debt is in default and money is needed to pay operating expenses and make improvements. The bureau is asked to take over the project, assume its debts, and reconstruct. The conclusion was that this could not be considered at this time.

A partial inspection of the Owyhee lands was made in the afternoon of July 10, on the way to Boise, Idaho. These lands are similar in character to those of the Boise-Payette area now under irrigation. The crops seen from the road from Notus through Caldwell and into Boise were uniformly good, nothing better in the way of ordinary farm crops having been seen in a 10,000-mile inspection. Only one conclusion could be reached from an inspection of these crops which is that the Boise area is an agricultural success. The explanation of its financial difficulties must be sought outside the operation of the irrigation works or the cultivation of farms.

The visit to Boise had not been planned. Time was made for it by shortening the inspection at Vale and Owyhee. It was made to enable the Secretary to confer with Senators, Congressmen, and local officers of the Boise project and representatives of water users regarding a controversy which had arisen over the collection of drainage charges more than a year overdue.

To understand this controversy, it is necessary to understand something of the evolution of this project and the complicated arrangements made with various groups of water users. Much of the land of this project was first irrigated from private works. They did not have a full water supply. To provide this a reservoir was needed, and this the Reclamation Bureau built. Then it sold water to some

canals under Warren Act contracts. It bought, enlarged, and extended other canals and built new ones for areas outside the original works. Out of these contracts have come different construction charges and some litigation with water users. There has also from time to time been strong antagonism between different groups of water users. These influences made the administration of this project somewhat difficult and the desire of those in charge has been to transfer its operation to the water users, but thus far no agreement satisfactory to all the interests has been reached.

Up to 1917 the project had paid practically all the Government's charges but in recent years the burden of private debts, low prices for crops, and an agitation for postponement or repudiation of irrigation charges have combined to create a critical financial situation.

Starting with practically no debt in 1919, the project's debt for the years 1920 to 1924 has risen to the staggering total of \$1,675,600.

To check this drift toward insolvency, notice was given in February, 1925, that no further blanket moratoriums would be granted, but relief would be granted where individuals could show they were entitled to sympathetic consideration.

Owing to relief extended in 1924 under the Phipps Act the construction and operation charges for 1924, amounting to \$857,375, were deferred and no effort was made to collect these. But \$72,916 which was due for drainage work done for irrigators by the Government more than a year before was over a year in arrears. Payment of this was requested. Water users were informed that these payments could be made in five installments beginning July 1 and concluding November 1. The amounts due from individual water users were small but this did not prevent an appeal. One individual owing only \$7.50 or five payments of \$1.50 each, filed a formal statement of inability to pay. We were convinced that this condition did not exist and in June the order was reluctantly given to shut off water from those who failed to pay the first installment of this charge by July 1.

Before that date more than 2,700 out of 3,000 water users had paid the first installment but those who opposed, secured a temporary injunction and arrested the project superintendent.

There was a question whether certain provisions of the Idaho State law did not

restrict the reclamation bureau from shutting off water from delinquents. If it did then all payments would hereafter have to be made in advance. The court subsequently ruled that the bureau's action was legal and practically all payments have been made.

The conference at Boise resulted in a statement by the Secretary asserting that it was the desire of the department to turn this project over to local control and outlining the procedure for doing this. His statement follows:

"In order that the settlers on the Boise project may have a definite understanding of what is needed in the way of organization to enable the settlers to take over the operation of the Boise project and secure the benefits of the fact finders' act, the people of the Boise project are advised that the department has decided on the following policy:

"(1) That a contract will be negotiated with the Nampa and Meridian irrigation district along the line of the contract heretofore submitted, which will grant relief of the following kinds:

"(a) The contract will provide for future construction payments on the basis of 5 per cent of the average gross acre income as determined by the Secretary of the Interior.

"(b) Provision will be made under which a suspension of construction payments for one year may be permitted in deserving cases where found to be absolutely necessary, but no blanket moratorium will be granted.

"(2) A similar contract will be approved with the Black Canyon irrigation district covering the lands under the Notus Canal.

"(3) If the lands of the Arrowrock division not now included in irrigation districts shall be organized as an irrigation district and the organization of the district confirmed by decree of court not later than April 1, 1926, a contract similar to the one with the Nampa and Meridian irrigation district will be authorized with the new district, providing the terms of payment outlined above.

"(4) Should such district not be organized by April 1, 1926, the board of directors of the Nampa and Meridian Irrigation district will be requested to permit the land owners of the unorganized part of the Arrowrock division, who may desire to do so, to petition their lands into the Nampa and Meridian

irrigation district, and the lands petitioned into the district will then be given the same terms applicable to the project lands now included in the district.

"(5) Under no condition will any contract be made with the Payette-Boise Water Users' Association, or with either of the two boards of that organization.

"(6) Land owners who insist on keeping their lands out of a district organization will be regarded as satisfied with their existing contracts and will be expected to meet them.

"(7) There will be no change in the ruling heretofore made in regard to the payment of drainage charges. The present ruling permits payment of these charges in five monthly installments. In the great majority of cases the payment now required in order to secure water is less than \$20, and in many cases less than \$10. If there is any land owner who has no other means of payment, or no credit, a few days' work for wages will produce the amount needed to pay this charge.

"(8) It is expected that foreclosure suits will be filed in cases where it appears that water users are able to make the required payment, but are refusing to do so.

"(9) The litigation recently initiated by the arrest of the Government officers for performance of their duties in carrying out the provisions of the Federal law, and also the civil suits started, will be carried to final judgment in the courts. The Government's officials will abide by the final decision of the courts, of course,

and the parties who have instigated the litigation will also be required to do likewise."

From Boise the party went to American Falls where on July 13, 20,000 people saw Secretary Work lay the corner stone of the American Falls dam. Gov. C. C. Moore, Senator Gooding, Congressmen Smith and French, and Gov. George Dern, of Utah were in attendance and an important group of railway officials including C. C. Calvert, vice president of the Union Pacific and one of the old timers of the West, were present.

The laying of the corner stone was followed by an industrial pageant illustrating the spirit of Idaho rarely equaled in the West. Its most striking feature was a portrayal of Indian life by 600 members of the Bannock tribe.

In its economic and financial aspects the American Falls reservoir is the greatest achievement of Federal reclamation. It will, if present plans are carried out, regulate the flow of Snake River so that all its water can be used. It will make available 1,700,000 acre-feet of storage at a cost of only \$5 an acre-foot. The greater part of this water will go to land already irrigated but which often suffers from drouth because of the wide variation in the unregulated flow of the river. It will practically double the value of the farms of irrigators whose water supply has been uncertain.

These facts alone make this a notable project but they are not its chief claim to

distinction. For that we must inquire into the way it has been financed.

When it was before Congress Mr. Cramton, chairman of the Subcommittee on Appropriations, inserted a requirement that private projects desiring an interest in this storage should pay for their respective shares in advance. This is being done. The money is being raised by the sale of district bonds. It is the strongest evidence which could be given of the solid value of this feature of the Minidoka project.

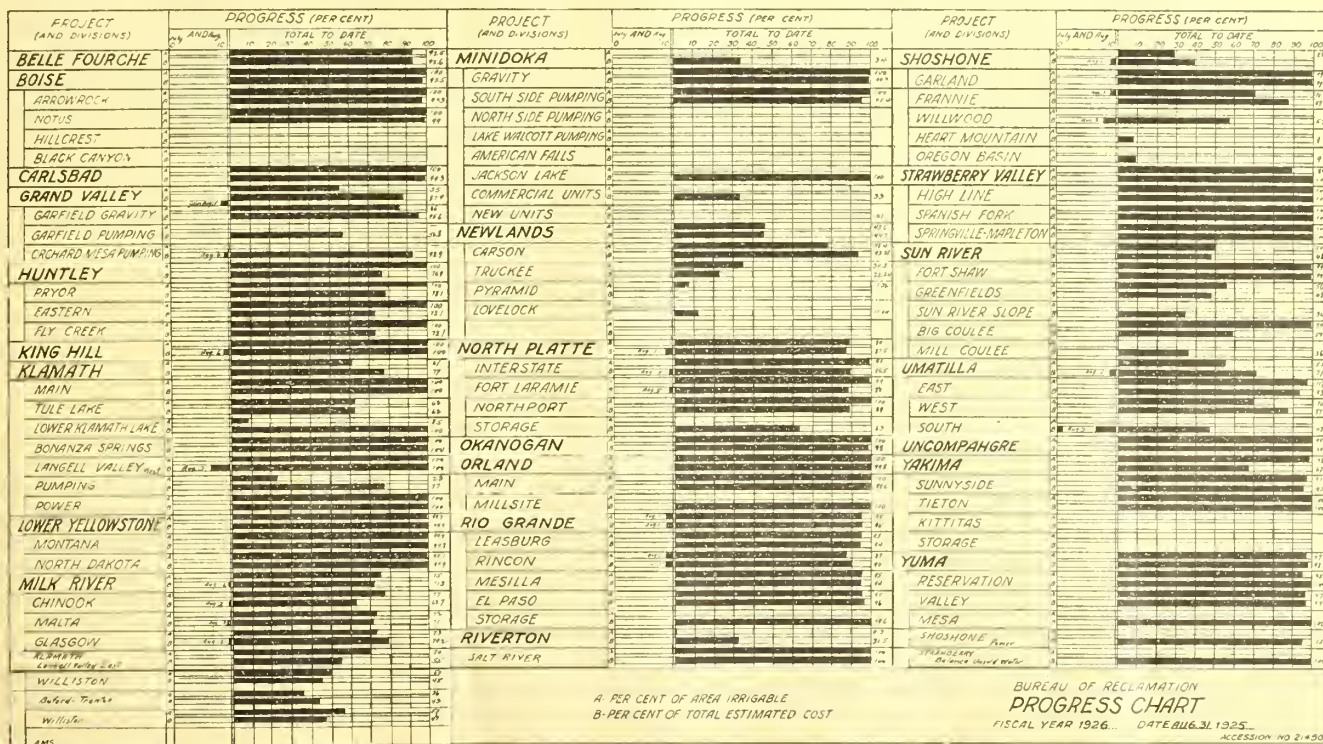
The following parties have contributed the sums named to the cost of this storage:

American Falls reservoir district	Amount
district	\$2,012,466.42
New Sweden irrigation district	127,500.00
SNAKE RIVER VALLEY irrigation district	102,000.00
MILNER LOW LIFT irrigation district	152,000.00
HILLSDALE irrigation district	150,000.00
	2,543,966.42

The Empire irrigation district has subscribed but has not yet been able to provide its contribution of \$442,579.79.

The arrangements for the American Falls ceremony were in charge of a celebration committee of which R. E. Shepherd, of Jerome, was chairman. Mr. Shepherd has been the money getter of this project.

(Continued on page 148)



REGULATIONS TO GOVERN THE SELECTION OF SETTLERS

Haphazard methods, under which any citizen who had not exhausted his homestead right, give way to careful selection on the basis of industry, experience, character, and capital

REGULATIONS for the selection of settlers on Federal irrigation projects in accordance with the terms of subsection C of the act of December 5, 1924, were approved on September 12 by the Secretary of the Interior. The regulations are as follows:

Subsection C of the act referred to is as follows:

"That the Secretary is hereby authorized, under regulations to be promulgated by him, to require of each applicant including preference right ex-service men for entry to public lands on a project, such qualifications as to industry, experience, character, and capital as in his opinion are necessary to give reasonable assurance of success by the prospective settler. The Secretary is authorized to appoint boards in part composed of private citizens, to assist in determining such qualifications."

Hereafter no entry for public lands within a Federal irrigation project shall be accepted by the local land office until the applicant therefor has satisfied an examining board, to be appointed on each project to consider such matters, that he is possessed of such qualifications (in addition to the qualifications required under the homestead laws) as to industry, experience, character, and capital, as in the opinion of the board are necessary to give reasonable assurance of success by the prospective settler.

Each applicant for entry of such public lands, including preference right ex-service men, and successful contestants under the act of May 14, 1880 (21 Stat. 140), shall file an application with the

Bureau of Reclamation which, among other things, must state with respect to the applicant, his or her age, status as to citizenship, whether married or single, number of children, and their sex and ages, other dependents, ownership of farm lands elsewhere and the value thereof, farming experience, assets and liabilities, and give references as to character and industry. The application may state the particular farm unit desired and may also include a second and third choice and, when practicable, the choice of a fully qualified applicant will be approved. However, the intent of the law is to select the best qualified applicants for all farms available and the Government must therefore reserve the right to distribute the farms to those best qualified, regardless of individual preferences.

Applicant must possess good health and vigor and have had at least two years actual experience in farm work and farm practice. The applicant must have at least \$2,000 in money, free of liability, or the equivalent thereof in livestock, farming equipment or other assets deemed by the examining board to be as useful to the said applicant as money.

The above minimum requirement as to capital and experience shall not apply when the farm (fractional farm unit) applied for is 10 acres or less in area and the applicant can show to the satisfaction of the examining board that the development of the farm is feasible from the capital the applicant may reasonably be expected to obtain as a wage earner.

An examining board of three members or more shall be appointed on each project by the Secretary of the Interior, or such officer as he shall authorize to make such appointments, to consider the fitness of applicants to undertake the development and operation of a farm. The members of such board shall serve for a period of one year, or until their successors are appointed, unless otherwise ordered by the secretary or such officer as he shall authorize to make such appointments. Each superintendent is requested to submit recommendations for membership on the board of examiners for his project at the earliest practical date.

A member representing the Bureau of Reclamation shall keep the records of the board and notify applicants when and where the board shall meet to deal with applications, in order that applicants may personally submit additional information as to their fitness for the undertaking.

The examining board shall note the date

of receipt by it of each application filed, and interview the applicants who appear before it, to determine the qualifications of prospective settlers. Careful investigation shall be made to verify statements and presentations made by applicants to the end that no misunderstanding may prevail either as to the applicant's fitness or his appreciation of the problems before him.

After decision by the board its conclusion, if adverse to the applicant, shall be reduced to writing and a copy thereof forwarded to the applicant by registered mail. Evidence of service of such notice shall consist of registry return receipt signed by the applicant, or his agent, or registered letter addressed to applicant at his record address and returned unclaimed. The board's decision as to the relative qualification of each applicant, based upon a percentage rating of the elements of industry, experience, character and capital, shall be final unless appeal from such decision be made to the Secretary of the Interior within 30 days from receipt of notice, and such appeal should be filed in the project office where the lands are situated.

The relative standing of applicants will be based upon a percentage rating, determined as follows:

Each of the elements of industry, experience, character, and capital will be considered as having a possible weight of 25 per cent, and applicants will be rated according to the following scale:

Industry:	Per cent
Fair.....	5
Good.....	15
Excellent.....	25
Farm experience:	
2 years or more in East.....	15
2 years or more in irrigation.....	25
Character:	
Fair.....	5
Good.....	15
Excellent.....	25
Capital:	
\$2,000.....	15
\$3,000.....	20
\$5,000.....	25

Approval by the board of an application, followed by the filing of water right or water rental application, when either is provided for on the particular project involved, which feature the board shall cover by appropriate notation on the application, will entitle the applicant to file homestead application at the designated local land office for the farm unit assigned to him. Such homestead application shall be made within 15 days from

(Continued on page 149)

SECRETARY GETS FIRST-HAND DATA

(Continued from page 147)

The arrangements made for the inspection at every project visited were complete and satisfactory. They showed the zeal, interest, and efficiency of the project officials. It was an evidence not alone of fitness for their task but of a high morale. This added duty fell on men already burdened with daily duties of an exacting character. A change in plans made it necessary for Superintendent Bond to drive his car all night to meet the party and all the next day to travel with it.

The conclusion is that farmers on reclamation projects will have larger rewards for their labors this year than in any year since the collapse of war prices. It affords the opportunity to put the finances of the old projects on the basis of paying as we go.

AGRICULTURAL COOPERATION MEANS MUTUAL HELPFULNESS

Those who are studying the problems of cooperative organization believe that cooperation among farmers for the proper conduct of their business holds promise of helpfulness to all the people

By J. C. Gilbert, specialist in market news and radio, Department of Agriculture

THE word "co-op-eration" is just a jumble of letters which means mutual helpfulness, team work, pulling together. It means doing in an organized way for many what happens every day when two or more people work together to accomplish a common end. Eight oarsmen in a racing shell must cooperate efficiently to win a race, but let one oarsman falter or break time and the result is confusion and the efforts of the others amount to little.

Agricultural cooperation is this idea of team work and mutual helpfulness applied to the many problems of the people who live and work on farms.

It is not necessary to tell the farmers who are members of the fruit growers' associations what cooperation means; they are practicing it, living it every day. But there are a lot of folks even in the country as well as in towns who know very little about organized cooperation among farmers. The purpose then of this article is to tell a little something about this farmer cooperation and what, when rightly applied, it may be able to accomplish for all of us in the marketing of farm products.

One of the Department of Agriculture exhibits that has been widely shown is called the "Bridge of Cooperation." On the left of the exhibit is shown a picture of the country, with farm yards and pastures, with cattle and sheep and hogs, and waving fields of grain—in short, the source of supply. On the other side is shown the city, with its rushing thousands of workers who must be fed and clothed. This represents demand. In between the two, "Supply" and "Demand," is a

beautiful bridge strongly built and of lasting materials. The giant foundation stones of the bridge are the principles of honesty and business integrity. The keystone is mutual confidence without which there can be no cooperation.

Cooperation is largely dependent upon these ideals as objectives. Why make the effort to organize for team work if greater efficiency is not to be striven for and also if group action can not make for economies and savings, even though only in the long run; why attempt to cooperate?

Most agricultural cooperative effort in this country has been applied to the problems of marketing farm products. It is impossible to understand cooperative marketing unless one knows the background. This means that we must understand what is meant by marketing agricultural products. Just what is marketing? "It is the doing of the necessary things that make it possible for the consumer to have and use the products of the farm." It is service rendered. Some is performed by the farmers, and some by the dealers or those commonly called middlemen. These services consist of many items among which are assembling and standardizing. This latter includes grading and packing for shipment. Then come transportation, storing, financing, and distributing. Only in a few cases have farmers fully realized the commercial value of a standardized product. How then shall they arrive at the happy time when they can see their products sold as manufactured articles are sold, one sale securing repeat orders, and each satisfied customer coming back for more and know-

ing just what to ask for? Can the farmers attain this end themselves or shall government step in and tell them by laws just what and where and when to market their goods?

It is possible for the farmer to work out his own problems. He can and is doing it.

Successful marketing includes more than standardization. It includes the use of efficient methods by which products are made available at the time and place of greatest demand. How many of us could tell where and when the greatest demand would be for sweet potatoes? Some folks claim that you can't foretell what the future will be; therefore it is impossible to develop a program and follow it successfully. The answer to that is to study what the California Fruit Growers Exchange or the American Cranberry Exchange has done in distributing its crops throughout the shipping season and into every available consuming center. There is hardly a turkey in the country but will be served this fall with an accompanying dish of cranberry sauce. It just must be, and it is possible because the cranberry growers themselves have applied business methods to their marketing.

"Now, just where does cooperation come in?" someone says. How does it make for efficiency, or economy, and who gets the benefits? These are simple enough questions, but they are not so easy to explain clearly and definitely, for many benefits to be derived from any method are often intangible and distributed over a long time.

The first cooperative associations developed around local shipping points. This was a logical starting point. Ten or fifty people with common marketing problems worked together to meet their problems. Cooperation could not very well begin with ten or a dozen men here and as many somewhere else, or between 1,000 men scattered over a large territory. Cooperation comes from contact. It develops from problems that you can not solve as individuals, but may hope to solve collectively.

If cooperation does not succeed on a small scale, it can not be expected to succeed on a large scale. If 50 farmers can not cooperate in their own community to accomplish some purpose, it would be useless for these 50 men to become a part of a group made up of several thousand men

(Continued on page 150)

THE SELECTION OF SETTLERS

(Continued from page 148)

the date of approval of the application, except in those cases where a preference right is being exercised, in which event the period provided by law for the exercise of the preference right shall control. Failure to so make such homestead application will entitle the board to approve another application for the same unit, allowing the applicant to make homestead entry; this procedure continuing, if necessary, until an approved applicant makes a homestead entry.

The above regulations relate in the main to the entry of vacant farm units upon existing projects and existing divisions thereof, and while suggestive of the procedure to be followed in the opening of new projects or new divisions, each public notice or order opening new projects or new divisions will contain detailed instructions on the subject of the qualifications necessary for prospective entrymen and the procedure under which such qualifications will be determined.

COOPERATION IS A DEVELOPMENT FROM WITHIN

The cooperative association must perform the marketing functions more economically or better than these functions are now being performed or the association can not expect to continue its operations

(Continued from page 149)

and hope to become good cooperators. If farmers who are thinking about organizing an association can not solve their local mutual problems among themselves, they could hardly expect to be successful as a part of a large organization.

Cooperation is a development from within. The spirit of cooperation can not successfully be forced upon farmers from the outside in the hope that they will catch the fever. If the spirit of mutual helpfulness is already manifest in a community, then an organization, either local or as a part of a larger one, has a chance to succeed.

A cooperative association, in addition to the spirit of working together, must have a purpose—a reason for being. "Cooperative marketing is a positive agent to perform a function. It is not, therefore, simply an end unto itself." There it is in a nut shell. There must be a reason for every cooperative organization. Either the marketing is not being done at all, is not being done satisfactorily, or is not returning a fair price to the producer.

Many enthusiastic promoters of cooperation state with great fervor and emphasis that farmers should always organize and that all farmers should be included in the organization. Such a promoter is working for himself, and not for the good of the farmer or of the consumer, or anyone. Usually he gets so much a head for members, the more the better for him.

Cooperation is not a panacea for all marketing ills and there is no magic or mysticism about it. Business principles that apply to merchandising in steel, lumber, oil or groceries, apply equally well to merchandising farm products through cooperative associations. Cooperative marketing is not a ready-made garment that can be bought ready to put on. In a practical sense it is rather a development of an idea and its success will depend largely on how completely the idea has been developed in the minds of the farmers comprising the organization. This idea is that the cooperative association must perform the marketing functions more economically or better than these functions are now being performed or the association can not expect to continue its operations. There must be, in other words, the necessity for the organization.

Many times unscrupulous organizers have formed associations of farmers and have brought dishonor on legitimate efforts by forcing an organization when

none was needed. Then again, failure after failure of sincere efforts by honest farmers has been due to lack of business ability on the part of the managers chosen. Honesty is not enough. Good products alone will not spell success. Business principles must be applied to farmer cooperative effort or it is handicapped from the start.

Many different purposes have prompted farmers to cooperate, but the purpose usually associated with the idea of cooperation is that of marketing one or a few products. It may be a fruit exchange marketing one or several kinds of fruit, a livestock shipping association handling cattle, sheep and hogs, a tobacco, a peanut, or a cotton cooperative. Usually the organization is formed on a commodity basis.

If the organization grows into a federation of a number of local units under one sales management, these often develop tendencies that make for success or failure.

Bigness in a cooperative is not a measure of success any more than an excessively

fat man can always be said to be having a better time than a thin man because he takes up more room.

One of the big problems in agriculture to-day is to produce intelligently. The consumer dictates and his wants must be filled. American men wanted to shave themselves in their own homes along with washing their faces and hands. Straight razors were inconvenient in many ways—took too many slices off chins—so the manufacturers produced safety razors.

Big organizations intelligently directed that teach farmers to produce what the consumers want and that return to the farmers full market value for the grade of product shipped are needed as much in agriculture as in other business. Being needed they are developing and rendering service.

Large scale associations can secure economies by distributing the overhead expenses so that the cost of handling each unit is reduced. Of course not all have been successful. Blunders of manage-



Cantaloupes are a profitable crop on many of the projects

ment and losses have occurred. The possibilities are there and it is up to the farmers to see that the management knows its business. If the organization is big enough it can pay salaries that will attract men of ability as managers and salesmen.

It is no criticism to say not many farmers are good salesmen. Salesmanship requires special qualifications. The big cooperatives can get men who know how to sell. They can establish brands and have distinctive labels and packages. These things have a distinct value in the market.

There are weaknesses, however, in large organizations. One is the loss of personal contact which members have with the management. This is responsible for indifference on the part of members and in turn makes it possible for the management to control for its own ends that which should be controlled by the membership. Committees of members from localities not a part of management are useful in correcting this evil.

Another weakness of the big organizations is the possibility of too much emphasis being given to price control. The idea gets abroad that because of the largeness of the organization and its volume of business it should name the price of the commodities.

Price making or setting of a price is not in itself a process of marketing. With the fullest possible information as to supply and demand, present and future, available to both buyer and seller, the price agreed upon is the outgrowth of confidence in the facts known to both.

In many instances farmers have received all too little for the products of their land and toil. Some fundamental step in the process of marketing has been faulty. It may be due to lack of standardization or it may be due to lack of proper financing. Either of these factors may be remedied by organization, but the process of correcting such deficiencies is relatively slow and the remedy often requires some very definite action by the farmers themselves. Sometimes the remedy is unpleasant and means loss of pride as producers.

The elimination of the middleman is possible. All the intermediate steps in marketing can be performed by the association, but each step, each service, must be paid for no matter who does it. Whoever can do it best will be the one to do it. If the association chooses to do more than assemble, standardize, grade, pack, and ship, it must accept the responsibility such action entails.

Bear this in mind, whether you are a farmer, dealer, or consumer: Every added function means added responsibility and possibility of a loss as well as a gain. Not

SAM NESS, SUCCESSFUL WATER USER

Greenfields division, Sun River project

IT is always a matter of satisfaction to submit a report on water users who are making a success in their farming operations. Mr. Sam Ness is the owner of 160 acres of land in the Greenfields division of the Sun River project, Montana. He was one of the first farmers to make sweet clover one of the important crops on the irrigated farm and this year he has the following crops: Sweet clover, 35 acres; alfalfa, 10 acres; barley, 20 acres; oats, 10 acres; wheat, 50 acres.

He cuts his sweet-clover hay with a binder, leaves it in the shock until it is cured, and then stacks it. In this way every leaf is saved and the crop is more easily handled and is in better shape to feed. His stock does well on this sweet-clover hay and he gets good returns from his pasture.

Last spring he plowed about 30 acres that had been in sweet clover and put in a crop of wheat. He has threshed his wheat with the following returns: On 6½ acres he had a yield of 52 bushels per acre, and on 20 acres he got 35 bushels per acre. The wheat graded No. 1 hard, and weighed 63 pounds per bushel and only 5 per cent of white bellies. The difference in yield above noted is due to the fact that the small field was well irrigated, whereas the larger field that went 35 bushels did not receive all the water it should have had. The farm laterals were not properly laid out and it was difficult to handle the water. This trouble will be corrected before another year.

every dealer makes a fortune, nor do all the railroad and interurban freight lines pay fat dividends. Every bit of service rendered is worthy of its share of the ultimate sale price. A just and equitable division is what we all want to see.

If cooperative effort among farmers can make for better products, more uniformly packed and graded, enabling transportation to be accomplished without loss and helping dealers to make an honest percentage of profit on the goods they handle, both the producer and the consumer will be benefited. It will then in truth be a bridge between supply and demand, and a blessing.

Those who are studying the problems of cooperative organization believe that cooperation among farmers for the proper conduct of their business holds promise of helpfulness to all the people.

A great deal has been said in recent years about the low grade of wheat that grows on irrigated land, but here we have a crop of wheat that takes the highest grade, and it was well irrigated. Mr. Ness had a small field of wheat where the land was in corn in 1924 and this wheat will grade about 25 cents per bushel less on account of the high percentage of yellow bellies. This seems to indicate that it is something to do with the condition of the soil rather than the application of water that makes the difference in color.

Mr. Ness has a field of sweet clover that will produce a fine crop of seed and a small patch of alfalfa that is heavy with seed and should give him a good return per acre. He is well pleased with the results this season and feels that he will make a still better showing in future years.

The average wheat crop on an irrigated farm has not, in recent years, been a profitable crop, and this will probably hold true on the Greenfields Bench this year, as the average yield will probably not exceed 12 bushels. And yet here is one farmer who, by improved methods and efficient use of water, has produced a crop that is over four times the estimated average. This project never will be a success under present methods of extensive wheat farming, but if we can induce some of the water users to profit by the experience of Mr. Ness there is hope of pulling things out of the rut and growing profitable crops. He hit the nail on the head when he said "We are trying to handle too much land."

YAKIMA DAIRY COW SETS REAL RECORD

A record of 420.7 pounds of butter in a period of eight months has been made by a Guernsey owned by Dr. J. F. Scott, of the Yakima project, Washington. The Guernsey, at the time of the report, was leading all other cows in the Yakima County Cow Testing Association, having produced an average of over 52 pounds of butter a month, or nearly 2 pounds of butter a day.

The testing association is proving a profitable venture to dairymen in keeping them informed whether they can afford to keep their dairy cows. During August members of the association disposed of 14 cows because tests showed they were not being kept at a profit.

EGG PRODUCTION AND PRICES MERIT CONSIDERATION

The fall and winter months are the season that determines whether the poultry enterprise is yielding the best returns. Pullets that lay in the fall are the result of foresight to hatch early

Prepared for the Era by the Bureau of Animal Industry

BEGINNING about the middle of August each year, the farm price of eggs begins to rise, reaching the crest about the middle of December. From then the price declines until the middle of April and remains low until August when the cycle described repeats itself. This general condition is well known. But the poultry raiser seldom realizes to what an extent the price of eggs, the production of eggs, and the time of hatching are related. He is usually surprised to learn that early-hatched and early-laying pullets produce more than twice as much income in a year as the same number of late-hatched and late-laying pullets.

PRACTICAL POULTRY ARITHMETIC

The fall of the year when egg prices are rising is an excellent time to consider some practical poultry arithmetic. It is a good time to note how many of this year's pullets are laying and how many are not, and if possible to determine why. Poultry specialists of the United States Department of Agriculture have studied the question in detail and have announced some illuminating results. The time to prepare for a good production of fall eggs is in the early spring, for if hatching is delayed beyond the middle of May, even the greatest skill in management can not outweigh this handicap. A few weeks' difference in hatching time is enough to cause several months' difference in time of laying and 15 cents or more difference in the price received for eggs. The following deductions by Federal poultry specialists are offered for the consideration of flock owners:

One hundred early-hatched pullets will produce about 16,000 eggs in a year at a value of \$466.67.

One hundred late-hatched pullets will produce about 9,000 eggs in a year at a value of \$187.50.

Early hatching yields benefits at other seasons of the year, including early maturity, early laying, better prices, and larger profits.

The financial figures mentioned are based on the production of commercial flocks and average monthly farm prices of eggs for the period 1910 to 1924.

Besides the returns from egg production, similar benefits may be expected from the production of early broilers. Chickens hatched early usually will lay by about October 15 and will produce eggs during the four months of the year when egg prices are highest, averaging between 30 and 50 cents a dozen to producers. Late-hatched pullets, on the other hand, can not be expected to lay before the middle of February. They lay fewer eggs and the eggs bring a lower price. The dates mentioned apply to average climatic conditions; in the Southern States the hatching and laying schedule should be about two weeks earlier.

FIGURES OF WIDE SIGNIFICANCE

In the figures mentioned may be found the explanation for wide differences in returns from poultry flocks. Generally with late hatching, growth is retarded by lice, mites, hot weather, and other conditions that cause heavy losses or unthriftiness among small chicks. On the other hand, birds which get a good start during

April and May are developed enough to resist the unfavorable conditions mentioned with but slight discomfort and loss.

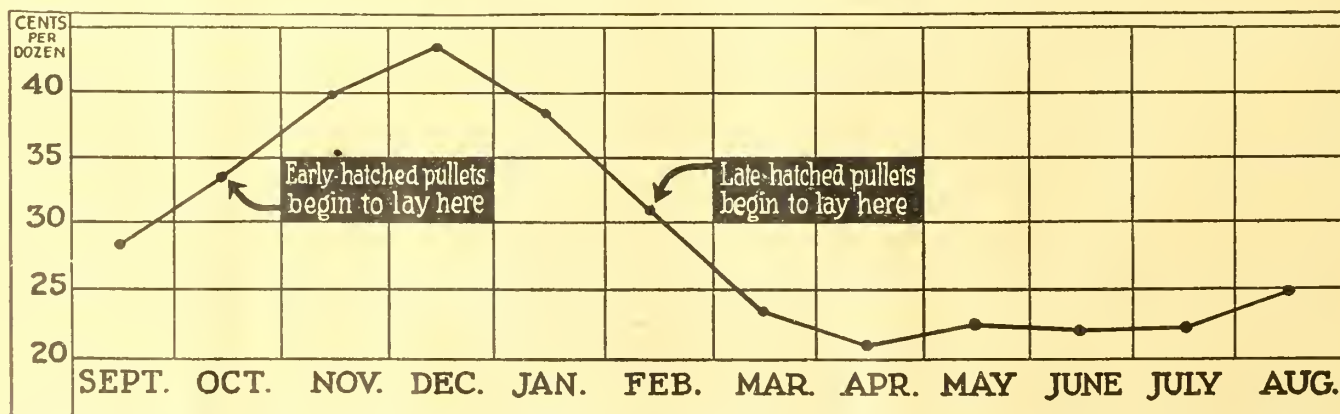
A fowl is a small livestock unit, of course, compared with other farm animals and on many premises is permitted to lay, sit, raise a brood, molt and shift for itself without much close attention. Such a method of management is fatal to best results with other livestock and can not be expected to yield the best returns with poultry.

The question of egg production and prices is important enough to merit studious consideration. The fall and winter months are the season that determines whether the poultry enterprise is yielding the best returns. If not, the late winter and early spring months are the time to correct the system of breeding and hatching so that another year will witness the profits which Federal poultry specialists assert are possible when correct methods are followed.

Government poultry literature is available to all who request it, including information on breeding, feeding, housing, incubation, brooding and general management. A staff of experts in the United States Department of Agriculture will also answer questions on special problems.

Heavy steers have been bringing higher prices than last year, hogs are nearly double the price of a year ago, and lambs have been higher priced.

Onions, cabbage, melons, and peaches have been selling at two or three times last year's prices and seemingly have a brisk fall market ahead.



Average monthly farm price of eggs, 1920 to 1924. The chart shows the close and important relation between returns from poultry flocks, time of hatching, and time of laying

NEW PROJECTS AND THE OLD

AN economic factor in Federal reclamation, formerly left to be dealt with after works were built, is the speculative inflation of prices of privately-owned land included in new projects. The law now requires that where private land is held in excess of homestead areas, the price at which the surplus shall be sold to settlers must be fixed before construction begins. To carry out this wise precaution requires patience and time in reaching an agreement with private owners to whom any curb on speculation is at first regarded with disfavor.

Where land is in private ownership, owners are now required to organize a district. Payments due the Government will by this action be collected under the operation of State laws, and controversies with individuals which have too often arisen in the past will be averted. An agreement on the part of those assuming this responsibility is not always reached at once. Time is required to bring about unanimity of opinion and action.

Satisfactory progress in preparing for new development has been made since the passage of the last appropriation act. The cost of two units of the Salt Lake Basin project, to be first constructed, has been fixed, and the terms of payment agreed upon. A local committee of water users is at work organizing an association which will, as an association, purchase the water.

The Spanish Springs unit of the Newlands project is an extension of that project, using, in part, the same canal. Before construction can be undertaken, the size of the original unit of this project has to be fixed. This requires a careful soil survey, which has just been completed. It also requires the conclusion of a contract with the Reno Power Co. Negotiations to fix the terms of this contract are well advanced and it is believed that a satisfactory agreement will be reached. When this is done, an agreement with the State will be sought regarding aid by the State, or by private enterprise in the settlement and development of farms.

On the Kittitas project, in Washington, a district has been formed. The terms of the contract with the district have been agreed to. The soil survey is nearing completion as is the classification of land and fixing of prices for surplus land. Only one further step requires to be taken on this project before construction begins. This is a contract between the State of Washington and the Interior Depart-

ment under which the State will undertake to furnish aid to settlers in the development of their farms.

The State of Washington has not as yet indicated willingness to undertake this, but a private association has been formed which is willing to assume this responsibility. This would be entirely satisfactory to the department, but authority from Congress will be needed. Meantime, the thoroughness of the soil survey and land classification enables land owners, settlers, and the Government to understand conditions and obligations of each before construction begins.

There are three new projects in Oregon. Appropriations for the Baker project have been made by three different Congresses. Construction has been postponed because of misgiving as to whether settlers who have capital enough to develop farms can be secured under existing laws. All reports agree that aid in settlement and development is needed. No provision for extending this has been made.

The Vale project contemplates the purchase of a share of the water in the Warm Springs reservoir. A tentative contract for its purchase has been prepared and submitted to the Warm Springs irrigation district. The appropriation for this project requires that the State shall extend financial aid and practical advice in settlement when the works have been completed. Legislation by the State of Oregon will be necessary. The Governor has been asked whether he is prepared to recommend this legislation. No reply has as yet been received. Meantime, the

THE WATER SUPPLY OF THE PROJECTS

The month of August was marked by an unusual amount of rainfall throughout the irrigated areas of the west. Threatened shortage on the Truckee lands of the Newlands project did not materialize, the natural flow of Truckee River being sufficient for irrigation without resort to pumping from Lahontan Reservoir. The only project experiencing a shortage is the Okanogan, and although the shortage there is serious, it is much less severe than for 1924. Complete information regarding Salt River project conditions are not at hand, but it appears that the situation is less serious than anticipated.

required economic investigations and negotiations for the necessary contracts are being continued.

The Owyhee project contemplates supplying water under Warren act contracts to a number of private irrigation districts. One of these districts has an inadequate water supply. In the others the water is being supplied by pumping, which is expensive. This project can supply it by gravity. A tentative contract has been submitted to the districts. A district will be formed for part of the project and a contract with it entered into. Soil and topographic surveys are being completed. Investigations to determine the suitability of the foundations for the dam, which will be one of the highest in the world, are nearing completion.

An appropriation for the reservoir and for enlarging the main canal of the Greenfields division of the Sun River project was made by the last Congress. This would add 57,000 acres to the irrigated area and give an adequate water supply to 43,000 acres in the existing project. The estimate of the cost has been completed. A contract with the holders of excess land, fixing the maximum price which will be charged settlers, has not been agreed to by water users. The appropriation requires the State to furnish aid in farm development after the works are built. The State of Montana does not feel able to undertake this responsibility, but a private corporation is being formed to provide this.

On the older projects a board of survey and adjustments has been dealing with those who claim relief under subsection K of the recent act. Its report will be submitted to Congress. The Division of Reclamation Economics has been conferring with the water users and others interested, with a view to settling lands not yet brought under cultivation, to improving agricultural practice and increasing the earning power of farms.

It is believed that some credit system which would enable farmers on old projects to refund their private debts and give them a longer time to pay and a lower rate of interest, should be put into operation.

In order to decentralize management and make settlers on projects more independent and self-reliant, an endeavor is being made to turn over to districts or associations the management of projects.

Standardization of farm products is rapidly attaining national and international importance. Federal grades are now available for 30 kinds of fruits and vegetables, one or more of which grades have been adopted by 25 States for use in intrastate as well as in interstate commerce.

COLUMBIA BASIN SPECIAL COMMISSION MAKES REPORT

Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, chairman, and Hon. John H. Edwards, Assistant Secretary of the Interior, believe that further information is needed before undertaking gigantic scheme

IN a report submitted to Secretary of the Interior Work recently, a special commission on the proposed Columbia River Basin reclamation project declared that the time had not arrived when local and national interests required its construction.

The report points out that the cost of this project has been fixed at \$193,360,000, which is \$158 per acre and that the Bureau of Reclamation is not possessed of the information needed to formulate a development plan as costly and complex as the one outlined for the Columbia River Basin. The commission making the report comprised Dr. Elwood Mead, Commissioner of Reclamation, chairman, and John H. Edwards, Assistant Secretary of the Interior. The report in full follows:

The Sixty-seventh session of Congress authorized, by joint resolution, the appropriation of \$100,000 for an investigation of the feasibility of what is known as the Columbia Basin irrigation project, in the State of Washington. The appropriation was made under the act of Congress dated February 21, 1923 (42 Stat. 1540). The investigation carried out under that appropriation has been conducted through a commission appointed by you to look

after details. This commission now reports that the investigation has been completed, and transmits its findings herewith for your information in order that you may in your discretion cause the same, with your comments, to be reported through the President to Congress.

Prior to this appropriation the Columbia Basin project had been investigated by the State of Washington, which has expended \$150,000 on this work.

Mr. Homer J. Gault, for many years an engineer in the Reclamation Service was selected, with your approval, to conduct the work in the field; he made a thorough survey and investigation of the engineering problems of the project during 1923, being assisted by soil experts from the Department of Agriculture and representatives of the Geological Survey who made studies of the water resources and of geological conditions as related to the location of various features. Mr. Gault's report was submitted in March, 1924. In this he outlined the result of his field work, discussed various alternative plans, and included the findings of the soil, geological, and water experts. A summary of the two alternative projects submitted by him is contained in the following table:

Comparison of gravity and pumping projects

Plan	Gravity	Pumping
Irrigable area (acres).....	1,406,000	1,133,000
Estimated cost.....	\$325,340,790	\$279,310,420
Cost per acre.....	\$231.40	\$246.58
Interest on cost at 5 per cent.....	\$11.57	\$12.33
Operation and maintenance charges and depreciation.....	\$2.66	\$4.65
Sum of annual costs per acre.....	\$14.23	\$16.98
Commercial power at Grand Coulee (horsepower).....		¹ 545,000
Difference in power possibilities (horsepower).....		² 316,000

¹ Without storage.

² With storage for power.

In Mr. Gault's report he calls attention to his omission of the following economic features:

"There are a number of pertinent subjects that are not discussed in this report, some of which are:

- "(a) Restriction of speculation in land.
- "(b) Organization of irrigation district.
- "(c) Means of financing the project.
- "(d) Terms of repayment.
- "(e) Limitation of land ownership.
- "(f) Probable rate of settlement.
- "(g) Market for and value of power produced.
- "(h) Feasibility from the financial standpoint.



Cutting the third crop of alfalfa on the North Platte project, Nebraska-Wyoming

"(i) Demand for irrigated land.

"(j) Capital required by the farmer."

The report was reviewed by a board of engineers taken from the staff of the Bureau of Reclamation, the members being A. J. Wiley, James Munn, and J. L. Savage. Their report devotes itself largely to a discussion of the reasons for the large increase in the estimates in the Gault report over those of former reports prepared under the direction of the State of Washington. Their conclusion was that this arises from differences in the estimates as to carrying capacities of the canals, the quantity of water required, its losses in transits, and allowances for overhead expenditures and contingencies; and that the Gault report represents a fair estimate of cost under the conditions prevailing at that time.

On further consideration, it was decided, however, by your commission to have a further review of Mr. Gault's report, and an independent investigation of the project which would include, along with engineering features, the settlement and farm development problems. This was required to make this report conform to the recommendations of the Committee of Special Advisers on Reclamation. This board of review was therefore selected to include men who were not only eminent as construction engineers, but who were also familiar with the economic and agricultural aspects of reclamation. It was composed of six members: Louis C. Hill, of California; Charles H. Locher, of Maryland; Richard R. Lyman, of Utah;

Arthur J. Turner, O. L. Waller, and Joseph Jacobs, of Washington. The report of this board was submitted in February, 1925. It considered five different plans or schemes of development. The one favored embraces 1,224,000 acres which, with the exception of 170,000 acres of pumping lands, is to be irrigated by gravity, using the waters of the Pend Oreille and Spokane Rivers. The construction cost of the works is fixed at \$193,360,000, which is \$158 an acre. This estimate includes provision for drainage and contemplates the lining of canals to the border of each unit. The reduction in cost below that of the Gault estimate is accomplished principally by changes in engineering design, including—

(a) Utilizing return flow and lining all canals, thus reducing diversion requirements and effecting large saving in size and cost of main canal system.

(b) Readjustment of gradients of main canal, reducing cost of tunnels and siphons.

(c) Utilization of Spokane River with Coeur d'Alene storage as an auxiliary water supply.

An alternative plan which would use Priest Lake as a storage instead of Lake Coeur d'Alene is included in the engineer's report, the cost being slightly larger.

This report agrees with previous reports in regarding the project physically feasible; the land is fertile, the water supply adequate, and climatic conditions make possible large yields of general farm crops and a variety of orchard and garden products.

The outstanding feature of this report is the attention given to the agricultural and economic requirements of the project along the lines of the recommendation of your Committee of Special Advisers on Reclamation. Two of the board's economic conclusions contained the following recommendations:

"That the State should assume its proper share of responsibility for collecting payments from the settlers, and should also bear its proper share of the losses, if any, incident to the development of the project.

"That the Government should clear and level the land and provide a reasonable financial credit for necessary farm improvements. Also as a guarantee against land speculation, and to insure that the settler secures the land at its fair value; that the Government acquire title to all the irrigable land within the project."

Your commission has no doubt that the time will come when local and national interests will require the construction of these works, and the utilization of these immeasurably valuable resources. It does not believe, however, that this time has arrived; or that the Bureau of Reclamation is possessed of the information needed to formulate a development program as costly and complex as the one outlined and advocated in this report.

So far as construction is concerned the procedure of the past could be followed, but building these irrigation works would not of itself insure solvent development

(Continued on page 156)



Oats in shock, Lower Yellowstone project, Montana-North Dakota

DANISH SMALL-HOLDINGS ACTS HELP HOME OWNERSHIP

The small-holdings acts of Denmark, including selection of settlers and financial aid from the government, have changed that country from a land of tenant farmers to a land of home owners

SLECTION of settlers on the basis of approved qualifications and capital and financial aid furnished to them to supplement inadequate capital are fundamental factors in virtually all successful schemes for planned rural development. These two factors have been recognized and put into practice for many years by numerous foreign countries in meeting problems of land development similar to those met by the Federal Government in its work of settling and developing the arid regions of the West.

One of the most outstanding examples of adequate selection of settlers and aided and directed settlement is the work which Denmark has been perfecting during the past 30 years. In this period, owing to the enactment of far-sighted legislation, Denmark has become a land of home owners instead of a country of tenant farmers. To-day more than 90 per cent of the people own the land which they farm. Here the small farms predominate. Of the 205,000 farms, approximately 100,000 average 50 acres in size, and another 100,000 about 20 acres.

In connection with the study now being made in the United States of the desirability of enacting legislation which shall provide for an adequate system of selection of settlers and aided and directed settlement during the early years of changing raw land into producing farms,

the following provisions of the Danish laws are of interest:

Under the act of April 3, 1924, the following persons may become small holders or acquire plots of land:

1. Persons whose principal means of existence is ordinary agricultural or horticultural labor, on behalf of other persons and for wages.

2. Rural workers assimilated to agricultural workers.

3. All those who live by agricultural work.

In addition, applicants must have the following qualifications:

1. They must be of Danish nationality.

2. They must be not less than 21 nor more than 60 years of age.

3. They must never have been sentenced by any court without having been rehabilitated.

4. They must never have received public charity which has not been remitted or repaid.

5. They must have done agricultural work for at least four years after having reached the age of 18.

6. They must be in such circumstances that they can not otherwise acquire land.

If an applicant fulfills these conditions he must present:

1. Certificates from two trustworthy persons who have knowledge of the applicant's circumstances and who testify that

he is sober and thrifty and is in a position to undertake the cultivation of the land.

2. A certificate from the municipal authorities of his place of residence declaring that he is fitted to become a small landowner.

The land selected by the prospective applicant must not exceed 21,000 crowns in value (1924-25), including the estimated value of the dwelling house, the livestock, and the moveables. The cost of of buildings must not exceed 11,000 crowns.

The state advances nine-tenths of the value of the property and the settler can not obtain loans on more than one piece of property.

The prospective settler must have available capital amounting to at least one-tenth of the value of the holding which he wishes to acquire; he must reside on the land; must cultivate it according to the system ordinarily adopted; and must be supplied with the necessary equipment and livestock.

The dwelling house, livestock, and equipment must be insured against fire in a company recognized by the state.

A part of the loan for the establishment of buildings, up to a maximum of 3,000 crowns, is free of interest. The interest rate is fixed at 4½ per cent. No part of the capital is repaid in the first five years. After five years annual payments are made of 1 per cent of the loans for buildings and 4½ per cent of that part of the building loan on which interest is paid, until the loan has been paid off. Thereafter the annual payment is 5½ per cent of the loan for the acquisition of land until the whole amount is paid off.

The land is acquired by purchase on the favorable terms indicated, subject to the following restrictions until such time as the payment of all that is due the state has been completed:

1. The holding must not be subdivided without the authorization of the ministry of agriculture.

2. The holding can not be transferred to third parties, except to sons or sons-in-law of the holder.

3. On the death of the holder the widow is permitted to continue to occupy the holding subject to the due fulfillment of the conditions laid down.

Since 1899 established holdings amount to 11,451. The total loan and grant of the state amount to about 100,000,000 crowns, of which direct grants amount to about 8,250,000 crowns.

COLUMBIA BASIN REPORT

(Continued from page 155)

or create real opportunities for settlers. Past experience in this and other irrigated countries is conclusive that solvent reclamation requires a program of settlement and farm development.

We are in accord with the essential features of the settlement and farm development program outlined in this report and believe that its economic features are sound and feasible.

This would involve, however, control of the prices at which privately owned land would be sold either through purchase by the authorities who build the works or through securing control for settlement from private owners. The subdivision of over a million acres of land with about 20,000 farms would have to be thought out and settlers secured who have the equipment and experience needed to cultivate this land, so as to secure satis-

factory returns. The report of the last reviewing board states that financial aid and practical advice to settlers are essential to successful development of this project. The methods of doing these things are still largely untried in this country and the first attempts to utilize them should be on a small scale. Only after enough experience has been had to determine what can be wisely and safely attempted, should they be applied on as gigantic a scale as will be necessary in the development of this project.

It is believed that the Gault report and the reviewing report should be published. The information will be of great value to all directly interested. It will inform the Nation at large of some of the requirements of future reclamation policy. No recommendation looking to further action by Congress is made.

COST OF MESA GRAPEFRUIT GROVE

CONSIDERATION is being given to the possible formation of another syndicate for the development of grapefruit groves on the Mesa division of the Yuma project, Arizona, similar to the one now in successful operation. All of the lands which it is proposed to bring into the proposed syndicate are lands that are fully paid up and upon which the owners are now paying the minimum water charges of \$15 an acre each year.

In this connection Project Superintendent Preston has prepared the following estimate of what it will cost to develop a 10-acre grove and the probable returns in the first five years. The estimate shows a net cost of developing such a tract, without including the cost of the land and water right, amounting to a little more than \$1,000 an acre. After the fifth year the net returns from a 10-acre grapefruit orchard may be estimated at \$500 to \$1,000 an acre each year, assuming, of course, that proper management and proper care of the trees have been carried on during the developing period.

The whole plan contemplates that the grapefruit trees will be of certified stock, and when they come into bearing will be watched carefully in order to weed out undesirable or unprofitable trees so that every tree is made to produce a profit.

Estimated cost of bringing into bearing a 10-acre grapefruit grove on the Yuma Mesa under syndicate management

FIRST YEAR¹

Establishing corners and taking topography, at \$2 per acre.....	\$20.00
Average leveling cost, \$60 per acre.....	600.00
Water distribution system, concrete pipes or flumes, \$170 per acre.....	1,700.00
Windbreak on north and west sides of each 10 acres.....	14.20
Trees, average planting 84 trees per acre, at \$1.25.....	1,050.00
Planting, including hauling, staking.....	168.00
Tree protection and installation.....	36.00
Mulching straw, 3 tons per acre, at \$4.....	120.00
Cover crop, seed and inoculation, \$5.50 per acre.....	55.00
Nitrate of soda, 1 pound per tree, ½ ton.....	40.00
Water, first year.....	210.00
Labor and teams, at \$40 per acre.....	400.00
Traveling, miscellaneous items.....	240.00
Incidentals.....	200.00

Supervision and overhead expenses, 15 per cent.....	4,853.20
	727.98
	5,581.18

SECOND YEAR'S CARE

Traveling, automobile and miscellaneous expense.....	\$240.00
Labor and team hire.....	400.00
Water charges.....	250.00
60 tons manure, at \$3.....	180.00
800 pounds sulphate ammonia, at 5 cents per pound.....	40.00
4,800 pounds complete fertilizer, at 4 cents per pound.....	192.00
	1,302.00
Supervision and overhead expenses, 15 per cent.....	195.30
	1,497.30

THIRD YEAR'S CARE

Traveling, automobile and miscellaneous expense.....	\$240.00
Labor and team hire.....	400.00
Water charges.....	250.00
80 tons manure, at \$3.....	240.00
1,600 pounds sulphate ammonia, at 5 cents per pound.....	80.00
9,600 pounds complete fertilizer, at 4 cents per pound.....	384.00
	1,594.00
Supervision and overhead expenses.....	239.10
	1,833.10

FOURTH YEAR'S CARE

Traveling, automobile and miscellaneous expense.....	\$240.00
Labor and team hire.....	400.00
Water charges.....	250.00
100 tons manure, at \$3.....	300.00
1,600 pounds sulphate of ammonia, at 5 cents per pound.....	80.00
16,000 pounds complete fertilizer, at 4 cents per pound.....	640.00
	1,910.00
Supervision and overhead expenses, 15 per cent.....	286.50
	2,196.50
Less credit by crop produced third year, 800 trees, average one-half box per tree; 400 boxes, at 4 cents per pound.....	640.00
Net expenditure.....	1,556.50

FIFTH YEAR'S CARE

Traveling, automobile and miscellaneous expense.....	\$240.00
Labor and team hire.....	400.00
Water charges.....	250.00
120 tons manure, at \$3.....	360.00
1,600 pounds sulphate of ammonia, at 5 cents per pound.....	80.00
16,000 pounds complete fertilizer, at 4 cents per pound.....	640.00
	1,970.00
Supervision and overhead expenses, 15 per cent.....	295.50
	2,265.50
Less credit by crop produced fourth year, 800 trees, average 2 boxes; 1,600 boxes, at 4 cents per pound.....	2,650.00
Net credit.....	295.50

SUMMARY

First year.....	\$5,581.18
Second year.....	1,497.30
Third year.....	1,833.10
Fourth year.....	1,556.50
Fifth year.....	295.50
Total cost to end of fifth year ²	10,172.50

¹ First year includes all expenditures up to end of year in which trees were planted ending with March 31 next after time of planting in April or May. Years thereafter are from April 1 to March 31.

² Does not include cost of land and water-right purchase.

³ Credit.

Other things being equal, the farmer who diversifies and can employ his laborers all the year can more easily obtain and hold an efficient class of workers.

IMPROVEMENT ON LOWER YELLOWSTONE

RECENT reports indicate that the general feeling among the water users on the Lower Yellowstone project is that the water charges should be paid as they become due. The farmers are almost unanimous in agreeing that the only way the project can be a success is to get on a cash basis and then force out the drones.

Collections from January 1, 1925, to the middle of August received by the project office or in the hands of the county treasurer amounted to \$28,523.01. Nearly \$10,000 was collected in the month of July, which is considered very encouraging, since at this season of year no returns are being received by the farmers and they have heavy expense financing their beet labor and other help necessary to produce a crop. They are further handicapped in making payment of Government charges in that the State law does not permit separate payment of irrigation charges. All taxes have to be paid at the same time.

In addition to the money already paid in, letters have been received from many farmers promising to pay one or more years' delinquent charges as soon as their crops are sold this fall.

During the past two years the agriculture of the project has made great strides

forward, owing to the establishment of crops that have a good cash value. Sugar beets, peas, beans, and cucumbers may all be contracted, so that the farmer does not have to depend on the whim of the market when the time comes to sell. The erection of a sugar factory this year will result in a saving to the farmers of \$75,000 to \$100,000 in freight annually, which alone is enough to pay all the money due the Government. Then, too, the production of beets compels better farming methods, which can not fail to be reflected in the returns from other crops.

During the recent visit of the congressional committee to the project Congressman Cramton is reported to have been agreeably surprised to see the development that has taken place there. He is stated to have remarked several times that the possibilities of the project far exceeded his previous conception of it based on the reports he had read.

When the soil is irrigated by flooding from field laterals an uneven surface causes needless waste of water, extra labor in spreading it over the surface, and smaller yields.

NOTES ON PERSONNEL AND PROJECT VISITORS

R. F. WALTER, chief engineer, and George C. Kreutzer, director of reclamation economics, spent several days in August on the Okanogan project, Washington, investigating the possibility of an additional water supply for the project from the Methow River.

Andrew Weiss, assistant director of reclamation economics, spent the month in Salt Lake City in connection with the work of the Board of Survey and Adjustments for the northern division.

Miss Emma A. Gibbs, of the Denver office, secretary of the Board of Survey and Adjustments for the northern division, and Miss Gladys M. Cummings, secretary of the board for the southern division, are working in the Washington office coordinating the material for the report.

George L. Evans, chief of the mails and files section of the Denver office, was a visitor to the Washington office during the month. Mr. Evans made a brief study of the Washington office filing system and was impressed with its efficiency.

District Counsel Fullerton was on the Belle Fourche project August 28 and 29 to confer with irrigation district officials and attend to a number of legal matters.

A. W. Walker, of the Denver office, was engaged on land classification and an economic survey of the Tule Lake division of the Klamath project during the first half of the month.

Visitors to the Lower Yellowstone project during August included H. W. Byerly, general immigration agent, and W. P. Stapleton, agricultural development agent, Northern Pacific Railway; and A. H. Bowman, commissioner of agriculture of Montana.

S. O. Harper, general superintendent of construction, spent August 3-5 on the Newlands project, inspecting the proposed Spanish Springs dam site.

Engineer Harvey McPhail, of the electrical division of the Denver office, spent some time in Reno investigating power matters in connection with the proposed Spanish Springs development.

District Counsel R. J. Coffey visited the Orland project during the month in connection with legal matters affecting the project.

A. S. Dawson, chief engineer, department of natural resources, Canadian Pacific Railway, was a visitor on the Grand Valley, Uncompahgre, Minidoka, North Platte, and Strawberry Valley projects.

R. F. Walter, chief engineer, and George C. Kreutzer, director of reclamation economics, arrived at Plymouth, Wash., on August 29. They were met by delegations from Pendleton and Portland interested in the Umatilla Rapida development, and spent the remainder of the day

inspecting lands claimed to be susceptible of irrigation in Washington and Oregon. On the 30th they left for McKay Dam.

Distinguished visitors on the Uncompahgre project during August included Prof. Duff Abrams, director of the Lewis Institute of Chicago; G. W. Anderson, engineer with the Burlington Railroad; P. H. Bates, of the Bureau of Standards; and W. B. Cheek, of the Portland Cement Manufacturers Association.

Robert B. Van Horn, maintenance engineer on the Tieton division. Yakima project, has resigned to accept a position as instructor in the engineering department of the University of Washington. His place on the project has been filled by the transfer from the storage division of Tom C. Mead. H. Ellis Sealing, senior draftsman, who has been engaged on the topographic surveys on the Kittitas division, has been transferred to Yakima to fill Mr. Mead's place.

E. B. Debler, of the Denver office, spent several days at American Falls Dam. W. H. Nalder and B. W. Steels, also of the Denver office, visited the work later in the month.

District Counsel Hamele was in the Denver office early in the month in connection with his work of revising the manual, returning to his headquarters at El Paso on the 5th.

Hon. Louis C. Cramton, chairman of the Subcommittee of the House Committee on Appropriations, in charge of the Interior Department appropriation bill, together with Congressmen Frank Murphy and Scott Leavitt, and F. J. Bailey, of the Bureau of the Budget, visited the Huntley, Shoshone, and King Hill projects, and American Falls Dam during the month. They were accompanied on the Huntley project by Hon. Charles H. Burke, Commissioner of Indian Affairs.

Ellis H. Diehl, chief clerk on the Minidoka project, has resigned, the resignation taking effect on September 11. Mr. Diehl has accepted employment in a public accounting office in California. He has been employed by the bureau since February 26, 1918.



Land in high cultivation on the Grand Valley project, Colorado

ACCRETIONS TO THE RECLAMATION FUND AND INVESTMENT OF THE UNITED STATES, BY STATES, JUNE 30, 1925

	Revenue collected from sale of public lands, mineral leases, etc., for the reclamation fund	Expended by the United States for reclamation ¹	Authorized under appropriation fiscal year 1926
Alabama.....	\$45,349.50		
Arizona.....	2,181,539.75	\$18,543,038.89	\$832,000.00
California.....	12,251,199.63	4,430,188.60	596,000.00
Colorado.....	9,877,094.50	11,638,733.35	441,000.00
Idaho.....	6,920,637.77	25,549,365.53	1,382,000.00
Kansas.....	1,033,483.94	334,474.96	
Louisiana.....	2,108.76		
Montana.....	15,439,148.01	16,263,280.74	930,000.00
Nebraska.....	2,082,192.33	13,065,310.00	980,000.00
Nevada.....	931,817.68	7,746,140.19	912,000.00
New Mexico.....	5,852,467.51	9,315,648.15	475,000.00
North Dakota.....	12,217,927.22	2,595,262.51	90,000.00
Oklahoma.....	5,921,707.68	84,349.93	
Oregon.....	11,675,476.36	9,247,709.43	2,355,000.00
South Dakota.....	7,765,206.35	4,167,807.86	1,655,000.00
Texas.....		6,339,628.63	245,000.00
Utah.....	3,765,314.77	3,674,435.40	1,305,000.00
Washington.....	7,299,498.39	16,169,715.77	1,115,000.00
Wyoming.....	26,225,357.79	16,238,327.59	1,534,000.00
Totals.....	131,487,527.94	165,404,437.53	13,357,000.00
Cost of secondary investigations, economic surveys and land settlement not allocated to States.....		615,361.49	159,000.00
Total.....		166,019,799.02	13,516,000.00
Total expenditures to June 30, 1925, for all operations.....		205,000,000.00	

¹ Includes cost of irrigation works and investigations, cost of operation and maintenance prior to public notice (net), deficits and arrearages in operation and maintenance after public notice to be repaid with construction, and unpaid charges for operation and maintenance after public notice.

COMMISSIONER CALLS SETTLEMENT MEETING

The representatives of the colonization and settlement organizations of western and southeastern railroads, and representatives of the State colleges of agriculture have been invited to attend a conference in Washington on December 14 and 15 to discuss settlement of reclaimed areas of the arid and semiarid regions of the West, and the swamp and cut-over regions of the South. This and related subjects will be combined in a program which it is believed will be of mutual benefit to the Bureau of Reclamation and others interested in rural development.

Although the program has not yet been definitely formulated, it is planned to have a few addresses, illustrated by motion pictures and colored lantern slides, to be followed by informal discussion of the various topics.

Secretary Work will make the opening address at the conference and an invitation has been extended to Secretary Jardine to be present and address the meeting.

That the conference will be a success is indicated by the large number of acceptances already received.

On the capital invested in agriculture the return for the year ended June 30, 1925, was at the rate of 4.6 per cent compared with 3.3 per cent in the year ended June 30, 1924.

FARMERS USE RADIO FOR NEWS OF MARKETS

More than 550,000 farms in the United States are equipped with radio, as compared with 365,000 in 1924 and 145,000 in 1923.

This rapid increase in the use of radio is attributed to the need of prompt market information in merchandising farm products, to the educational value of radio, and to its entertainment features.

OWYHEE PROJECT CLAIMS PRESENTED

The following is from a statement read by Mr. E. C. Van Petten on the occasion of the visit of Secretary Work and Commissioner Mead to Ontario, Oreg., in which Mr. Van Petten presented very forcefully the claims of the Owyhee project:

In the Owyhee project you have not only eliminated all the rough land as of old, but have given each 40 acres a careful soil survey by men who could spot a piece of greasewood a half mile away, and they have eliminated every piece of land with greasewood or an alkali spot on it. From this project you have eliminated every acre of all except first and second class lands, although we note most of the other new projects have taken into their acreage third and some fourth class lands. Mr. Strahorn did not leave an acre in the project but will stand a higher water charge than the project figures.

Doctor Mead, in a letter addressed to me June 4, says:

"The feasibility of these two projects (Vale and Owyhee) seems to hang on working out plans of prompt settlement and agricultural development. This is what all of us must be thinking about, and I am writing you to urge your co-operation."

We agree with Doctor Mead in the necessity of foreseeing things that affect the welfare of the project. The old Chinese proverb fits the situation: "He who starts in the wrong direction makes the journey twice."

An average of 2,500 horsepower-hours is utilized on each farm.



A Boise project apple orchard



Part of Mrs. Will Rhodes's flock

POULTRY RAISING PRODUCES PROFITS

Mrs. Will Rhodes, of Hermiston, Oreg., on the Umatilla irrigation project, has furnished the following statement showing the results obtained from 600 day-old chicks from April 11 to December 31, 1924:

ASSETS	
Receipts:	
Eggs sold.....	\$225.08
Cockerels sold.....	137.25
Pullets.....	153.50
Cockerels on hand.....	30.00
Pullets on hand.....	292.50
Feed on hand.....	40.35
Total.....	\$78.68
LIABILITIES	
Expenditure:	
Cost 600 day-old chicks.....	135.00
Cost of feed.....	259.97
Depreciation on buildings, 9 months.....	22.50
Subtotal.....	417.47
Net earnings for the period.....	461.21
Total.....	\$78.68

WAGES FOR LABOR MORE THAN DOUBLE

An interesting sidelight on the increasing cost of construction of irrigation projects is given in the accompanying chart, which shows the average rate of wages paid for common labor on 28 reclamation projects, 1904 to 1925, inclusive.

The chart, data for which were compiled by W. I. Swanton, an engineer in the Washington office of the Bureau of Reclamation, shows that, with moderate fluctuations the average rate was practically the same from 1904 to the latter part of 1915, when the influence of the war began to be reflected in the wages demanded, resulting in a comparatively sharp rise to the peak early in 1920. The period of deflation and consequent unemployment is indicated by the equally sharp drop in the average rate from 1920

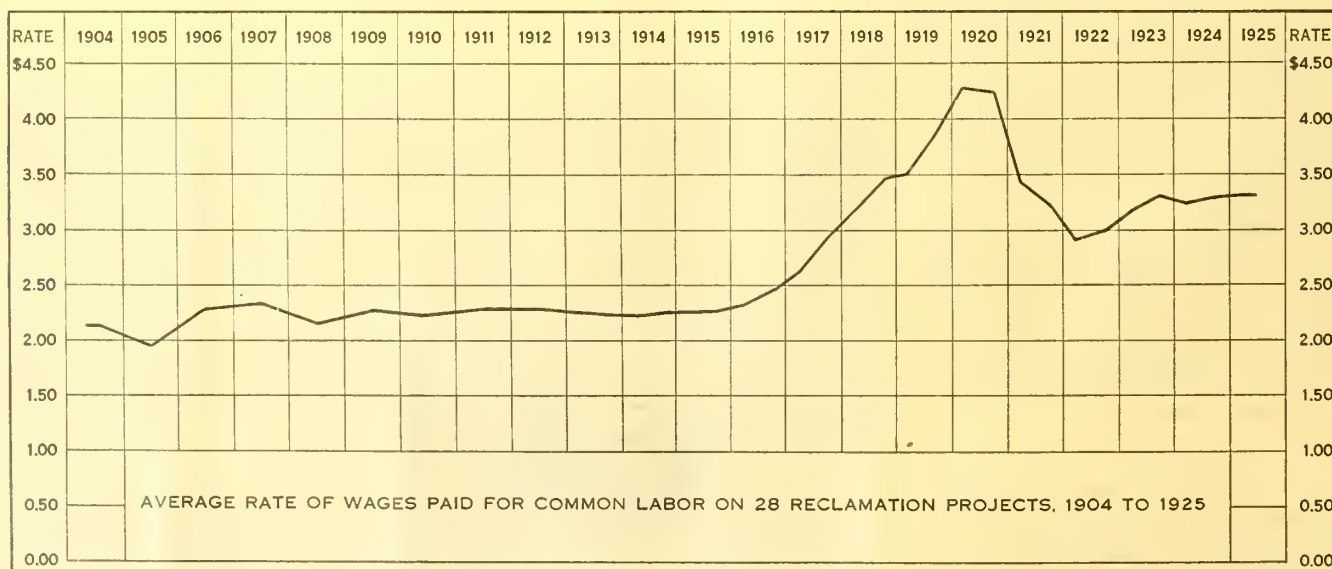
to 1922, when, following more nearly normal conditions, the rate begins to climb again to the present average, approximately 50 per cent higher than that of the pre-war period.

LIVESTOCK INCREASE YIELD OF ALFALFA

C. L. Smith, agriculturist of the Union Pacific system, states that in one of the fertile irrigated valleys of the West, where alfalfa hay is one of the leading market crops, the average yield per acre has steadily decreased for the past 10 years. This decrease is on farms where no livestock is kept, and as all the hay produced has been sold the yield has dropped from 6 or 7 tons per acre down to 3 or 3½ tons. On adjoining farms where livestock is kept, the hay fed on the farm, and the manure intelligently applied the yield of alfalfa amounts to 7 or 8 tons per acre.

This emphasizes the fact that, to be permanently successful, more attention must be given to the maintenance of soil fertility. Diversity of crops and systematic crop rotation, with livestock in some form, are now and have been for ages the best, most economical, and satisfactory method of maintaining soil fertility. When a man can realize \$13 per ton for his hay, or \$6.50 per ton for corn silage, by feeding it to lambs on his own farm he should consider that he has marketed his labor at a fair price if his only profit is the manure.

Too much bedding in the hog house causes the hogs to sweat badly.



NEW RECLAMATION ERA

VOL. 16

NOVEMBER, 1925

NO. 11



THE IRRIGATION PROJECTS RAISE THOUSANDS OF TURKEYS ANNUALLY FOR THE HOLIDAY TRADE

SUCCESS in irrigated agriculture and the solvency of reclamation projects depend on selection of settlers, peopling the land with men who have the experience and the skill to grow high priced crops and to cultivate the land in a way to get large returns. Poor farming, growing of crops that require little skill or care in cultivation, and which bring small returns, characterize most of the projects where payments are not being made.

One of the first conditions in the beginning of new projects is to work out an agricultural program, to determine what kind of crops ought to be grown, and to endeavor to secure settlers who like that kind of agriculture. The beginning of a new project gives an opportunity that ought to be used to make cooperation the basis of its organization, to try and unite the settlers so that they will grow enough of particular crops or produce to enable them to sell at an advantage, and to use teamwork in doing so. Only in this way can the man on 20 or 40 acres do business on equal terms with the farmer on 1,000 acres.

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

NOVEMBER, 1925

No. 11

HIGH LIGHTS IN A REVIEW OF THE MONTH

THE field man of the sugar company makes the conservative prediction that the beet fields of the Powell Valley, Shoshone project, will produce an average yield of $12\frac{1}{2}$ tons an acre, an increase of nearly 2 tons over the yield of previous seasons. At the contract price of \$6.50 a ton, without including expected bonuses on the basis of sugar content, beets will bring a cash return to the farmers of \$200,000, or more than \$80 an acre.

THE Churchill County Eagle sums up the cantaloupe situation this year on the Newlands project as follows: Shipments strong; returns satisfactory; yields excellent; and quality very fine. More than 200 cars of melons have been shipped. Jones & Jewell harvested 2,307 standard crates from $6\frac{1}{2}$ acres, making an average of 355 crates per acre. A. H. Groth shipped 2,750 crates, and Sutton Bros. 4,000 crates.

REPORTS on some 3,000 cars of cantaloupes shipped from the Salt River and Yuma projects indicate that they went to 110 cities and towns in 36 States and Canada. The estimated total movement of Arizona cantaloupes this season is around 3,800 cars, thus breaking all previous records.

THE grain producing territory in the Klamath irrigation project and in Tule Lake will produce an estimated crop of 800,000 bushels, valued at approximately \$850,000. Wheat is estimated at 250,000 bushels, and rye, barley, and oats at 175,000 bushels each.

SEVENTY-FIVE carloads of sugar beets will be shipped from Klamath County to the Sacramento Valley Sugar Co. The field representative of the sugar company stated that although late planting precluded any phenomenal crops, the grade of sugar beets raised in Klamath this year is equal to and, in most cases, better than the best beets raised anywhere in the West.

A CATTLE buyer from California recently purchased 10 head of registered cattle from the Longheath farm on the Newlands project. He was attracted to this territory because of its freedom from tuberculosis. It is not the policy to encourage the exportation of grade cattle from the project, but an occasional exportation of a few head serves to stimulate interest among local dairymen in their herds and assist in establishing a price locally.

IN accordance with an act of Congress, the Secretary of the Interior recently authorized the sale or lease of the Williston project. The property to be disposed of includes an electric power system, irrigation works, city waterworks, the lease of a coal mine, and the purchase of certain miscellaneous equipment. Competitive bids will be received on November 2. The proceeds of the sale will be paid into the reclamation fund.

THE record price of $61\frac{1}{2}$ cents per pound for butterfat was paid to dairymen on the Newlands project in September. The project farmers think this is a pretty good answer to the question, Does dairying pay?

THE pickle-salting station at Nisland, Belle Fourche project, was closed on September 23, when the Mexicans were ready to start on the beet harvest. About 25,000 bushels of cucumber pickles were grown on the project and the average price was about \$1 a bushel. Some fields gave a return of \$200 to \$450 an acre.

AN effort is being made on the River-ton project to induce owners of private lands for which water will be available in the spring of 1926 to sign a three-year contract to take water on a rental basis. Steps are also being taken to open to entry a number of the desirable pieces of public land lying in the same part of the project.

A 10-ACRE grapefruit orchard on the Yuma Mesa, set out in the spring of 1923, will yield about 15 fruit per tree, or about 150 boxes for the 10 acres. All of the Mesa orchards are in very good condition.

THE annual fair of Dona Ana County, Rio Grande project, was held from October 7 to 10, a particular feature being the competition between local farm bureaus in the exhibits. A cotton exposition is planned for El Paso from October 26 to November 2.

HARVESTING of an unusually abundant crop has occupied the entire Yakima project, with prospects for excellent prices for all farm products. Shipments from the project were unusually heavy, totalling 9,529 carloads for the season, compared with 4,251 for the same period in 1924, and valued at \$6,000,000 to \$7,000,000. In view of the extremely satisfactory crop returns throughout the valley it is anticipated that payments will be met more promptly than in the past.

ABOUT 60 acres of cotton were grown on the Orland project this season, but when this was written it had not yet matured sufficiently for picking, and its success as a project crop is still to be demonstrated.

SEVERAL farmers on the Grand Valley project are contracting to feed sheep and cattle during the coming winter. This will not only furnish an outlet for surplus forage, but will increase the fertility of some farms which are particularly in need of this treatment.

AGRICULTURAL fairs were held on the Minidoka project at Burley on September 2 to 4 and at Rupert September 18 and 19. At each point splendid exhibits of farm products and livestock were displayed.

THE PROBLEMS OF FEDERAL RECLAMATION

Address by Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, delivered on October 26, 1925, at Chicago, Ill., before the Western Society of Civil Engineers

OPPORTUNITIES for home making on the public lands of this country have been the greatest single influence in shaping our national character. Free land was the beacon hope that attracted the hardy and adventurous from the hills of New England and from the farms of Germany, England, and the Scandinavian countries. The voice of opportunity called and found a response in the energetic, self-reliant, and ambitious.

This westward march of settlement continued without interruption until it reached the borders of the land of uncertain and scanty rain. There it halted because it encountered obstacles that individuals working alone could not overcome. Up to that time the creation of homes had been an individual matter. The pioneer believed that every man should hoe his own row and take care of himself. It created a confident and hopeful people but made them migratory and speculative. The pioneer was not a good farmer. He was ready to move on when there was a chance to sell out at a profit, and gave little thought to the needs of the rural civilization he was helping to create.

The development of irrigation requires a different attitude. It imposes laws of its own which must be observed. People who live under irrigation canals must cooperate. They are bound together by their common tie of dependence on the stream. Protected by irrigation from the uncertainties and vicissitudes of rainfall, that insurance has to be paid for. They have to level their fields so water will flow over them evenly. They have to pay large assessments to maintain and operate these works. To meet these charges the irrigator has to be a skilled cultivator; only the good farmer permanently survives. The best cultivated farms on this continent are in irrigation districts. Those around Greeley, Colo., rival those of the Lothians in Scotland.

Whether he likes it or not, the farmer under irrigation has to lose some of his freedom. He must keep step with his neighbors and irrigate when his turn comes. This means that plans must be made in advance and a kind of organization adopted that the farmer who depends on rain can ignore.

The pioneer settlers of the arid region did not at once realize the profound change which irrigation would enforce. They gave little thought to the institutions they must adopt. For a time they

were able to work and think as individuals. By means of a simple plow furrow they turned water from streams over the thirsty soil of the low-lying bottom lands. But opportunities for this kind of development were limited. Soon the bottom lands had been filed on, all the cheap ditches had been built.

Then it began to be realized that if the magic touch of water was to bring into fruition the latent agricultural wealth of this inland empire, a different and much costlier type of irrigation work had to be brought into being. Reservoirs were needed to hold back the floods, costly aqueducts had to be carried through precipitous mountain canyons. Only in this way could orchards and gardens be planted and homes made on the better soils of the higher plains.

These great structures cost more money than single settlers, or even organizations of settlers could provide. The capital required soon went beyond the means of corporations. Finally, about the beginning of this century, it was realized that only the Nation or the States had the credit and the reserve of

resources needed to bring into existence the monumental structures required for the complete conquest of the arid region.

The reclamation act passed by Congress in 1902 was the outcome of this new and broader conception of the future of irrigation. It set aside the proceeds from the sales of public land; later on added to this half of the money coming from mineral leases, to create a fund with which to build irrigation works. This fund was to be augmented further by the money received from water users in payment for irrigation works. These payments were to be made in installments extending over 20 years. No interest is charged on deferred payments. Water users pay the equivalent of 5 per cent interest for 20 years and get the works as a gift. Other governments donate a part of the cost of important works but none build them without charging interest.

The act has been in operation for 23 years. About \$160,000,000 has been spent on construction. The repayments have been disappointing. On only one project has even half of the cost been repaid. On some, settlers have paid nothing on construction and are in debt for much of the cost of operation.

In its agricultural aspects, dotting the unpeopled areas with homes has brought large returns. The crops grown in 1924 on 24 projects were worth \$66,488,560. One hundred and forty-three thousand people live on the irrigated farms and an additional 337,000 in project towns and cities. When all the farms are occupied there will be from 15,000 to 20,000 more. Reclamation has done much to save some arid States from economic collapse. The situation in Nevada would be critical if it were not for the Newlands project. Counting those who live on this project, the State has only 70,000 people. This little handful of citizens supports government, schools, courts, and higher education over an area larger than the State of Illinois. Without the Newlands project farms, with their winter feed for range stock, it is difficult to conceive how this State would carry on with its shrinking resources in mines and forests.

Western irrigation areas are now our main source of long-staple cotton. Millions of dollars which now go to the irrigation farmers of Texas, Arizona, and California would, without Federal reclamation, go abroad to the cotton growers of Egypt. Without the local fodder crops of irrigated farms, the range livestock industry of the arid West would collapse.

PLANS FOR FUTURE RECLAMATION WORK

Doctor Mead has completed work on his annual report to the Secretary of the Interior for the fiscal year ended June 30, 1925, and this is now in the hands of the printer. He has also submitted his budget for the fiscal year 1927 to the Budget Bureau. With these two important subjects taken care of, the commissioner left for a trip to New York and Boston, where he met with representatives of the press and men connected with the furtherance of agriculture and related subjects in our eastern colleges. He returned in time for the hearings scheduled before the Budget Bureau, on October 18.

On Monday, October 26, Doctor Mead delivered an address before the Western Society of Engineers in Chicago, the text of which is carried in this number of the Era.

From Chicago he proceeded to Birmingham, Ala., where he was invited by Governor Whitfield to participate on October 29, in the program of the conference called for the purpose of discussing reclamation projects and other questions of interest to that section of the country.

These Federal projects have given an economic support to cities that sorely needed it. They have increased the business of transcontinental railroads, furnished markets for the products of factories, and contributed far more to the economic strength of this country than is realized in the humid sections of the country.

But along with these achievements, which have gone far to justify the Government's activity in reclamation, there has gone a tragic waste of money, effort, and opportunity, because the problems of finance, of farming, and the human needs of settlers have never been adequately thought out nor plans made to meet them. Lack of economic and social plans have wrecked some projects and have created the problems that the Interior Department and Congress are now seeking to solve.

THE LARGER CONCEPTION OF RECLAMATION

Congress realized at the outset that reclamation requires money and skilled engineers. These were provided. It was not realized that money and expert advice and direction in changing the sagebrush deserts into farms would be needed; these were not provided. It was not realized that to repay these immense costs settlers must be skilled cultivators. Their selection and training were ignored.

If reclamation is to go on we must now provide for meeting these human and economic needs. Only by doing this can the monumental enterprises now being pressed on the Government be made a success.

The irrigation works of the Columbia Basin project in Washington will cost nearly \$200,000,000. The water right for a single acre will cost \$158. To that must be added the cost of changing raw land into farms, which will average \$100 an acre. The Colorado River now irrigates 2,000,000 acres. When all its waters have been conserved and used, it will irrigate 6,000,000 acres. The agricultural development of these two valleys will cost more than a billion dollars. Without skilled farmers working with good tools, owning good stock, and using science and skill in cultivation, the money spent on construction will be thrown away. To make these costly works pay there must go with them an agricultural and rural civilization as far removed from that of the covered wagon as that of Denmark is from that of central Africa.

It is a task worthy of our ablest minds, one of the greatest which ever challenged the ability and patriotism of this Republic. Let us, therefore, undertake to appraise some of its requirements and follow

the evolution of the last quarter of a century, in order that we may understand what has been achieved, what mistakes have been made, and what tasks confront us.

WE SHOULD PROFIT FROM PAST EXPERIENCE

To begin with, Federal reclamation can not succeed unless it is divorced from politics. Less attention in the future must be given to local importunities. This means disappointing some States which desire the expenditure of a share of the fund within their borders, regardless of the cost or what the results will be after works are built. From the first, western Congressmen have been subjected to strong local pressure to get works built and afterwards to relieve settlers from their payments. The high construction costs of to-day render it imperative that hereafter reclamation be freed from all danger of political control.

The reclamation policy was founded on the theory that if irrigation works were built, settlers would flock in and in some way dig in and succeed as they had on the prairies of Iowa and Kansas. The difference between the conditions which confronted a homesteader in Iowa, where a paying crop could be grown the first year, and in Arizona, where the land had been baked for centuries, and where after costly preparation a year or two of unprofitable watering and cultivation would be needed before good yields could be obtained, was ignored by these beginners.

The settler in Iowa could begin as a farmer, doing farm work. The settler on a reclamation project has at least a year's work that is not agricultural but engineering. He confronts a tract of unleveled, unfenced sagebrush. Before he can grow a crop he has to have a shelter for his family and his work team. His land has to be fenced to keep out range cattle and sheep. The inequalities of the surface have to be smoothed off so that water will flow over it evenly. For a beginner, this is hard and discouraging work. It requires tools that the farmer from the East has never before seen. It requires a peculiar knack and skill to do the work properly, and it is often enormously expensive, costing as high as \$75 to \$100 an acre. The settler sees his savings eaten up doing unproductive work, and when his capital is gone, he has to succumb.

A majority of settlers on these projects did not know what crops to grow or when they should be watered. All the conditions were strange and new to them. If these harassed farmers could have been organized so that their efforts could have been combined and they could have touched elbows in preparatory develop-

ment, its influence in keeping up their morale would have been invaluable. Working alone, without practical advice or direction, much that they did was done at a disadvantage.

THE PROBLEM OF COLLECTION

Lack of aid in farm development has burdened inexperienced settlers on these projects with heavy private indebtedness and caused thousands of mortgage foreclosures. This has demoralized reclamation finances. The unpaid assessments for construction and operation for the five years from 1920 to 1924 total \$8,500,000. This was increased in 1924 by over \$3,000,000. Some of the projects during that period have paid practically everything they owed. Some had paid practically nothing. In some cases failure is due to unfit lands. No matter how hard the settler works, he can not earn the money to repay project costs. On others, a policy of drift has caused good projects to remain undeveloped, the fertile soil uncultivated.

The Lower Yellowstone project in Montana is an example of the latter type. It needs only good farmers working on small farms to make this as good an irrigation project as those around Salt Lake and Denver. Owing to the fact that a large part of the land is held by speculators who are not farmers, only 14,000 acres out of 58,000 acres in the project were irrigated in 1924, fifteen years after water was first supplied. Some of the unirrigated land is dry farmed, there being rain enough to grow small grain; some is still covered with native grass. If these owners had been real irrigators, desiring to farm, no compulsion to irrigate would have been needed, but under a system which opened the land to settlement to the fit and unfit on equal terms, communities were gathered together, here and elsewhere, many of whose members knew nothing of irrigation farming and never intended to become farmers.

On another project which we are trying to salvage, I recently went over the list of occupations of the early settlers. The first was a deep-sea diver, the next was the wife of an itinerant baseball player, the third had been a missionary in China. A defunct bank owned several farms. A painter, a plumber, a carpenter, all living in distant cities, owned farms, all unoccupied and untilled. A transient trained nurse had invested her savings in one of these speculative temptations. She had neither the money nor inclination to do more. None of these people have paid water charges or delinquent county taxes for three to five years. Creation of a

PRODUCTIVE VALUE OF WATER AND COST TO PROVIDE IT

A fundamental study for all future projects—Elimination of land speculation essential to success—Financial conditions of old projects warrant conservatism in new construction

(Continued from page 163)

great agricultural community or the solvency of an irrigation project can not be secured with this kind of human material. On projects like this the fundamental problem is to get real farmers to replace these derelicts who have given up hope but linger on, like Micawber, waiting for something to turn up. In one neighborhood there are 70 abandoned farms and a lack of morale everywhere. If an expert practical committee had selected these settlers and they had been advised about their work there would now be no important salvage program or possible loss to either settlers or the Government. The deep-sea diver would have stuck to his element, the bank would not have failed.

WATER FOR IRRIGATION SHOULD BE WORTH ITS COST

The fundamental question of all future projects ought to be, Will the productive value of the water in irrigation be worth what it costs to provide it? This is far more important than it was 25 years ago because the costs of construction and of farm development are two or three times as great as they were then. When Congress passed the reclamation act, \$25 an acre was regarded as the maximum construction cost which any settler could afford to pay. Even this figure seemed preposterous to the pioneer.

About that time a range cattleman met a settler who had agreed to pay \$10 an acre for a water right in a private ditch. He told the settler he could never do it and he might as well end his misery at once by jumping in the river and drowning himself. The cattleman looked on \$10 an acre for a water right as a prohibitive price. He had built his own ditch with a plow and a scraper. He cut the logs for his cabin out of the near-by forest. His pole fence had cost him nothing in money. Time and labor with him had not counted, hence going in debt \$10 an acre, with payments on interest and principal, was regarded as financial folly, foredoomed to disaster.

When, however, bills for Federal projects were presented to settlers, instead of \$25 an acre, the charges often ranged from \$30 to \$100 an acre. On top of this there was a yearly assessment for operating expenses. Out of this have grown controversies which have embittered the relation of the Government and the water users for 20 years.

No one was to blame. The law was an experiment. Conditions which would confront settlers were not foreseen. The agricultural and economic needs of reclamation were not realized.

LAND SPECULATION MUST BE ELIMINATED

Another evil of reclamation not entirely foreseen, and against which the original law provided inadequate safeguards, was land speculation. This has been a vampire that has done much to destroy the desirable social and economic purposes of the act. The original idea that Government works would be built to irrigate public land, and that this land would be homesteaded free of cost, developed and cultivated by actual owners, has not been carried out. As it has turned out, the act has been largely used as a life-saver for bankrupt private projects.

The first project begun was in Arizona, where on Salt River the land had been acquired by private owners who had built canals to divert the unregulated flow of the river. They found this would not answer. They had full canals in June and empty ones in August. Agriculture was impossible without a storage reservoir to hold back the floods and deliver water for late irrigation. Financially embarrassed private projects could not build the reservoir. The Government undertook it. Then it was found that the private projects could not raise money to repair and enlarge their canals so they could use the stored water. The Government then acquired the canals. Finally it became a Government scheme, serving land which was in private ownership when the project was authorized. Eastern capitalists held thousands of acres of this land. Speculators also rushed in and bought, at low prices, thousands of other acres.

On all the projects, unwary people attracted by misleading publicity, bought farms from speculative owners at inflated prices. Land sellers told settlers they would have no trouble with water right payments and so induced them to invest their capital in land, and when pressed to pay the Government charges the embarrassed settlers made recurring appeals to Congress for relief.

Between 1921 and 1924 three bills were passed by Congress authorizing or requiring deferment of payments. These

deferments did not aid the struggling settler who had already paid his Government assessments. The relief all went to the nondebt payer. The purpose behind these moratoriums was commendable, but their influence has been demoralizing. They have created a wrong psychology on some projects. They have placed the nondebt payer in the saddle. They have demoralized the bureau's finances and broken down the morale of the local officials, who have been struggling against heavy odds to keep the projects solvent undertakings.

Believing that blanket moratoriums are an economic evil, I notified settlers in spring of 1925 that hereafter relief, when extended, would be to individuals; and to them only after a showing that the delinquency was due to obstacles they were unable to overcome. That notice has caused the bureau to lead a strenuous life. Applications for individual relief came in this year by the thousands. They had to be examined and reported on in the field, and then scrutinized in the Washington office. In all cases the underlying idea was to give them a sympathetic consideration, but to insist on payments where the Government's generosity was being abused. As a result of this action, hundreds of thousands of dollars were collected where blanket deferment would have resulted in nonpayment.

FINANCIAL CONDITIONS ON OLD PROJECTS REQUIRE CONSERVATIVE ACTION IN STARTING NEW ONES

Financial and agricultural conditions on the older projects require that careful attention be given to all matters which will affect the solvency of new ones. The last Congress made appropriations for six new projects. Their acre-cost is far higher than that of any Government works hitherto built, either in this or any other country. The estimated costs vary from \$125 to \$160 an acre. The land is unimproved. Everything needed to make a farm will have to be placed on it and this will cost on an average about \$100 an acre. The settler will, therefore, face an investment of between \$225 and \$260 an acre when his farm is a going concern, and the question is will these farms be in demand by people able to develop and pay for them? Local people assure us that we need have no fears about settlers or payments. They insist that the farms will be taken and that the charges will be

paid, but their judgment may be biased by their passionate desire for development. When these appropriations were under consideration, I appeared before the Appropriations Committees of both Houses of Congress, and stated my conviction that without adequate aid and direction in settlement and farm development, none of these projects would be a success. I stated that it would require from \$5,000 to \$7,000 to improve and equip an 80-acre farm; that settlers with this much capital would not pioneer, because they could buy improved farms in the East or South.

I believe we must look for settlers who have between \$2,000 and \$3,000, which is enough to underwrite a loan for completing farm development. I believe if we accept them as settlers and permit them to expend all their capital we are bound to provide a source from which the remainder of the capital needed to complete farm development can be secured.

An excellent bill for this purpose was introduced in the House and in the Senate by Congressman Winter and Senator Kendrick, respectively. It provided for advances of money from the reclamation fund. It was my recommendation, however, that if this were done, instead of applying the law to all the projects, it should apply to only two or three where

it would be treated as an educational measure, as an experiment or demonstration, rather than a definite policy.

The outcome of the discussion in Congress was provision in appropriation legislation for four projects that States should furnish aid and direction in settlement and farm development. On these four projects the State is required to supervise settlement of the land and provide credit for developing farms. None of the States are willing to do this. This is the feature of reclamation which we have thus far ignored, but it is not new in other countries. Aid and direction in farm development are fundamentals of reclamation development in India, Italy, Australia, and South Africa. Agricultural development will be advanced by being decentralized by taking it away from the Federal Government. Aid and direction in settlement and farm development is a proper function of the State. Unless it is provided by the State or some other local agency the building of canals should cease. We must not build them for speculative landowners. Helping men own farms has changed Denmark from a land of discouraged impoverished tenants to a teacher of agriculture to the rest of the world. That comes from having 90 per cent of the land cultivated by owners.

An act passed by the last Congress requires that hereafter there shall be a thorough soil survey of the lands of each new project; that the land shall be classified according to earning power and that annual payments for water right shall be in an amount equal to 5 per cent of the average gross crop return. Recent regulations of the Secretary provide that settlers on public land must have a capital of \$2,000 and have had at least two years' experience. This is the first time in the Nation's history that qualifications for settlement have been required. The required qualifications of industry, experience, character, and capital are indispensable to success if we are to build costly works. The inexperienced and those without money would fail, and in the end the loss would fall on the Government.

Fairness to the settler and to the scheme requires that whoever undertakes to subdue the desert and bear the burden of its costs should be fitted for the task. If reclamation is to be the chief instrument in building up rural civilization in the western third of our country, it must provide real opportunities for home makers, give them a lifetime in which to develop and pay for farms, and have efficiency and integrity as the watchword in all relations between the water user and the Government.



CONGRESSIONAL PARTY INSPECTING THE KITTITAS DIVISION OF THE YAKIMA PROJECT, WASHINGTON

Left to right: J. C. Hubbell, Bruce Bonny, Congressman John W. Summers, Oro McDermith, Congressman Louis C. Cramton, J. L. Lytel, project superintendent, Congressman Burton L. French, Congressman Addison T. Smith, F. A. Kern

THINGS A PROSPECTIVE SETTLER SHOULD KNOW

The price of improved and unimproved land on the projects, the cost of equipment and improvements, the settler's capital, how he can augment it by loans, and the interest he will have to pay

THE Reclamation Bureau recently called for information concerning the price of improved and unimproved land on the projects, the best size of farms, the cost to improve and equip the farm, and the amount of capital needed by an experienced settler, exclusive of the purchase price of the farm, in order to succeed on an undeveloped farm. The replies, as far as received, are summarized in the accompanying table.

An additional question covered the sources from which settlers can borrow money to supplement their capital to develop farms, the length of payment period, and interest rates. Information on this important point was furnished by the projects as follows:

Yuma project, Arizona-California.—Local banks loan money on crop mortgages or under certain conditions as second mortgages upon the farm at rates of interest running from 8 to 10 per cent. Generally these loans are short time loans upon crop mortgages. The loan is made in the spring or summer and is paid out of the first returns of the crop.

Orland project, California.—Settlers can borrow money from the Federal Land Bank of Berkeley, Calif., the Pacific Coast Joint Stock Land Bank of San Francisco, and private banks, all of which make loans on practically the same terms offered by the Federal land bank,

whose terms are 5½ per cent on a loan extending over 31 years.

Grand Valley project, Colorado.—Very few agencies are furnishing money on farms for farm equipment. Most of the land sold for the last few years has been with a small down payment and three or five years for the balance. The deferred payments usually bear interest at 8 per cent, with an occasional loan at 7 per cent. Money is available for short chattel loans from local banks, with a usual period of six months and at the rate of 9 or 10 per cent. The best merchant paper well secured carries an 8 per cent rate.

Uncompahgre project, Colorado.—Available sources of loans are banks, loan companies, and individuals. The farm-loan bank is not at present operating in the valley under the project. Loans are usually made for a period of three years, occasionally for five years, the rates averaging 8 per cent for real-estate mortgages and 10 per cent for chattel mortgages.

King Hill project, Idaho.—At the present time money can not be obtained on the project farms; and farms in the making stand less chance of obtaining credit. Short-time money is loaned to some extent on crops and chattels, and the usual rate is 10 per cent, although lower in some instances.

Minidoka project, Idaho.—Long-term loans can usually be obtained from mort-

gage companies and sometimes from the land banks. Short-term loans on crop mortgages can be obtained from local banks. The prevailing terms and rates for real-estate loans are five years' time and 8 per cent interest. Local banks charge 10 per cent interest on chattel and crop loans, the usual term being three to six months. Renewals can usually be obtained where security is good.

Huntley project, Montana.—It is very difficult to borrow money at this time. About the only available source is the Federal land bank. The repayment period covers 33 or 34 years, with interest at about 5½ per cent.

Milk River project, Montana.—The right sort can borrow locally, but must show that they are workers and know how to farm under irrigation. Length of payment period, 10 years; interest 6 per cent.

Lower Yellowstone project, Montana-North Dakota.—The Federal land bank does not favor loans on this Government project and the local banks can handle only small amounts of short-time paper. The interest rate is 10 per cent on this class of loans.

North Platte project, Nebraska-Wyoming.—Money to supplement capital can be borrowed at local banks and from loan companies. Such loans usually run from one to three years and bear interest at 8 to 10 per cent.

Newlands project, Nevada.—"It is impossible for a settler to borrow money on his homestead until he has secured a patent from the Government."

Carlsbad project, New Mexico.—The best source is the Federal land bank, which loans up to 50 per cent of the estimated value of the farm. The length of payment period is 34 years, and the interest per annum, including payment on principal each year, amounts to 6 per cent.

Rio Grande project, New Mexico-Texas.—Federal farm loan banks operate in both districts of the project, and loans are made from such source in reasonable amounts.

Umatilla project, Oregon.—There is no available source at present where money can be borrowed to develop a farm. Money is available only for improved places. For example, if a settler were to level 40 acres of land and build his flumes or ditches, he could not borrow money on his farm. If, however, he had enough

Settlement and financial data

Project	Price of private land per acre		Best size of farm	Cost to improve and equip farm	Amount of capital needed by experienced settlers, not including purchase price of farm
	Improved	Unimproved			
			Acres		
Yuma	\$150-250	\$50-150	40	\$3,000-5,000	
Orland	250-750	125-150	20	5,000-10,000	\$5,000
Grand Valley	90-150	20-50	40-60	2,000	3,500
Uncompahgre	50-250	20-100	40-60	2,100-4,000	2,000-5,000
King Hill	35-150	15	40	5,000	
Minidoka	75-150	50-75	40	4,000-5,000	3,000
Huntley	75-150	10-50	60-80	6,000-10,000	3,000-5,000
Milk River	30-75	15-40	80	3,000-4,000	3,000-5,000
Lower Yellowstone	40-125	20-50	80	3,000	2,500
North Platte	70-200	40-100	80	6,500	5,000
Newlands		150	40	4,000	4,000
Carlsbad	75-250		60-80	3,500-5,200	4,000
Rio Grande	150-250	75-150	20-60	2,000-5,000	2,000-5,000
Umatilla	150-200	30-50	40	8,000	5,000
Klamath		125	40-100	4,000-7,000	1,500
Belle Fourche	40-125	20-50	80	4,000-6,000	2,500
Strawberry Valley	100-200	75-100	40	2,000-3,000	2,000-3,000
Okanogan	500-1,000	100-150	5-10	3,500-7,000	2,500-5,000
Yakima	800-2,000	40-75	20-80		5,000-7,000
Riverton		15-25	80		2,000-5,000
Shoshone			60-80	4,000	2,000-4,000

¹ And up.

capital to get a good stand of alfalfa on 20 acres, he might get a \$1,200 loan on a first mortgage. Private capital is out of the market for loans on irrigated lands.

Klamath project, Oregon-California.—Local banks help finance those able to show material and moral assets. Ordinarily notes run 90 days to 6 months, sometimes 9 months. The interest rate is 8 per cent.

Belle Fourche project, South Dakota.—Local banks have restricted loans to such an extent that only the best farmers with Class A security can obtain short-time loans. The Federal land bank and larger loan companies are not operating on the project, and the State rural credit has suspended activities.

Strawberry Valley project, Utah.—Farmers are usually financed through local banks. Seasonal loans for six months are obtained at 8 per cent interest; mortgage loans for 5 to 10 years bear 7 per cent; and the Federal Land Bank of Berkeley, Calif., makes long-time loans over a period of 34 years on the amortization plan at about 5½ per cent.

Okanogan project, Washington.—Local banks and mortgage companies are the sources for loans to supplement settlers' capital. At present real estate loans are difficult to secure. Mortgages run from 3 to 10 years, with the average interest rate about 8 per cent. Short-time loans are made at 9 and 10 per cent.

Yakima project, Washington.—Money may be borrowed from private loan companies on unimproved land of good quality; and the Federal land bank and mortgage loan companies loan reasonable amounts on improved land at varying rates from 5 to 8 per cent.

Riverton project, Wyoming.—Settlers of good character on unimproved land whose farm equipment is unencumbered can get money for seed and similar purposes from local banks on chattel mortgages for a term of six to nine months at 8 to 10 per cent interest.

Shoshone project, Wyoming.—At the present time it is doubtful if a new settler could borrow money to supplement his capital. The local banks have loaned to the limit. The State of Wyoming has appropriated \$2,000,000 to be loaned to farmers of the State under a 30-year 5 per cent amortization plan of payment, but as yet none of this money has been placed on the project.

Feeders who can not understand the poor condition of their animals when given good feeds, should examine them carefully for ailments and remove the cause.

SOUND ECONOMIC BASIS NECESSARY

By Commissioner Mead

AN erroneous impression seems to prevail that there has been needless delay or opposition to carrying out reclamation projects for which appropriations have been made by the last Congress.

The bureau desires to carry out the purposes of the reclamation act of December, 1924, and to build projects wherever a sound economic development is assured. It is unwilling, however, to begin construction of any project until arrangements have been made which will comply with the law and insure contented and prosperous homes when those projects have been built.

The situation on old projects, the investigations of the fact finders' committee, and the hearings of the last Congress make it evident that there had been too great haste in the past in beginning construction. Failure to settle in advance all the questions which a project presents has resulted in controversies with irrigators which embitter the relation of the Government and water users after a lapse of 20 years. Another reason for care is the fact that construction costs of new projects are from two to three times what they were 15 years ago and when all the older projects were built. It becomes a serious question, therefore, whether the value of water in production will equal its cost, and this needs to be carefully studied. The Great War has doubled the cost of improving and equipping farms and it is necessary that settlers be informed of the capital they will require and that conditions necessary to enable them to make a comfortable living and repay the money invested by the Government be provided.

LEGAL WORK OF THE RECLAMATION BUREAU

In the construction, operation and maintenance, and administration of Federal irrigation projects the Bureau of Reclamation is confronted with an array of legal problems. Settlement of water rights, preparing contracts for the building of irrigation works, purchase of machinery, equipment, and other materials, acquisition of rights of way and easements over lands needed for project development are matters requiring the services of members of the legal profession. There are 14 attorneys in the bureau, 4 at the Washington headquarters, and 10 in the field.

The greater part of the land on new projects is privately owned. Some owners hold large tracts. The law requires that these owners shall organize irrigation districts and shall contract to repay the Government all the money spent and that the land they hold in excess of a homestead shall be appraised and the price at which it shall be sold to settlers shall be fixed. Negotiations to perfect these arrangements take time.

In some cases, delays are due to the people most concerned. The Salt Lake Basin project in Utah is an illustration of this. The Government has had its plans and estimates for this work ready for months. The land that is to be irrigated is all settled and the farms on which it is to be used are highly improved, but they have an inadequate water supply from private ditches. The price to be paid for water is satisfactory, but the local organization, which includes some of the ablest business men in the State, has not been able to organize the water users and make the necessary financial arrangements to insure the repayment of \$3,000,000 that the works will cost. Like prudent men, they are taking time to determine what they ought to do. The bureau is willing for them to take this time, but desires the public to understand the causes of the delay.

On the Vale, Oreg., project the contract for the purchase of water may have to be confirmed by the courts before the money is paid and construction begins.

Because of the high construction costs of these new projects which are the highest of any Government irrigation works in any country, Congress required in the appropriations for four projects that the State should undertake the settlement of the land and help finance the development of farms. None of the States in which these projects are located has as yet seen its way clear to assume this financial responsibility.

It is believed that an understanding of conditions on old projects and the problems which confront new ones will justify the actions of the bureau in its efforts to place the operation of old works and the development of new ones on a sound economic basis. With such understanding and the cooperation of Congress and local interests, plans now so well under way will insure without interruption the irrigation development of the West.

REDUCING THE GAMBLE IN RECLAMATION

There is demonstrated need for the selection of settlers on the basis of industry, experience, character, and capital, if the Government's investment in reclamation is to be properly safeguarded

Editorial from the Engineering News-Record

FOR the first time in the country's history, the right to settle on public lands is limited by a qualification requirement beyond merely citizenship. The Reclamation Bureau has just put in force on existing projects the settler-selection plan established by the new reclamation laws passed at the last session of Congress. According to the regulations established the settler must have \$2,000 and two years of farm experience to be admissible.

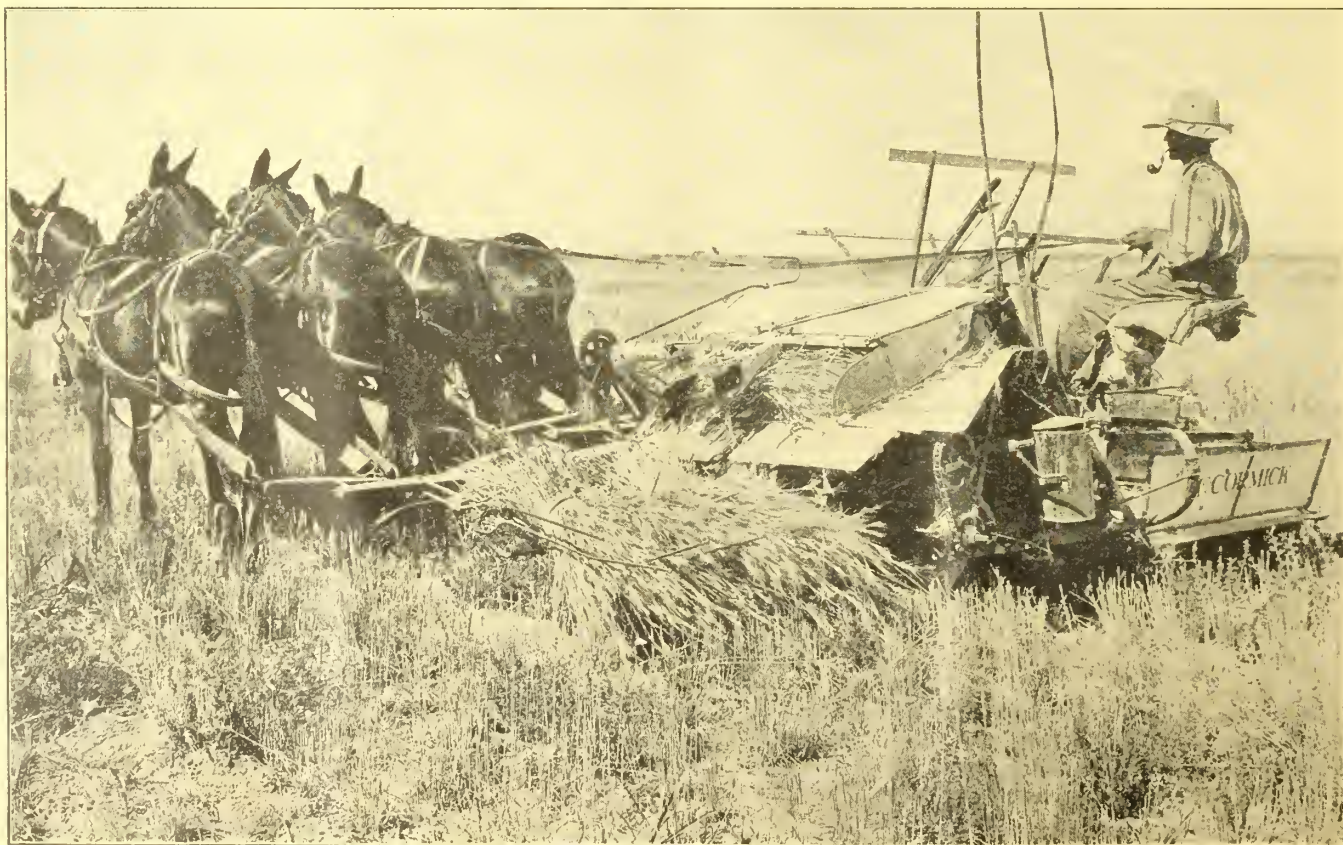
Back of the new system is the hard fact that 15 or 20 years of reclamation experience have shown that farming a piece of desert land under an irrigation ditch requires experience, capital, determination, and hard work. Settlers who lacked experience and capital usually failed, and sooner or later had to go back, bankrupt, to their former occupations. They had, of course, taken this risk when they first decided to try reclamation farming, and their right to gamble against fate in this way is perhaps no one else's business. But their failure proved a serious injury to the progress of the reclamation projects, which makes the matter of much wider concern.

It is strongly asserted by many men of sincere convictions that the adventurous spirit which urges its possessor to stake his future on the long chance of success in making a productive farm home on the irrigated desert is of such remarkable value that nothing should be done to interfere with it. The system now established does interfere with it. It is on this point that sharp differences of view exist.

The advocates of unrestricted settlement assert that a man's freedom to shape his career, take a large risk in doing so, and if necessary to make a failure, is a human right and should not be circumscribed; that the exercise of this right operates to single out the strong and bold and capable and makes them the pioneers and leaders of a new country. They say that any system of exclusion or selection is ruinous paternalism, a substitution of false and unnatural principle for the unerring natural selection upon which we must depend. Those who hold the opposite opinion point to the staggering list of failures in irrigation settlement, and insist that it is folly to lure doctors, grocery

clerks, and school-teachers out into the sagebrush, equipped with ignorance of farming and wistful hope, to make inevitable failures. They cite as proof of this folly the huge losses that have resulted from the construction and operation of costly irrigation works supplying water to the farms on which these misfits and incompetents settled, never to contribute a single dollar to operating costs or repayment of the debt resting on the property.

But the views of the two opposing sides are not incompatible. One may concede the excellence of the pioneer spirit—the spirit of adventure, of willingness to bear hardship for a gambling chance of success—and yet recognize that practical considerations and financial prudence must also be kept in mind. The plain fact is that the delicate question in reclamation policy is not whether a man should gamble with his own money, but whether he shall be permitted to gamble with other people's money. Great sums of public money are at stake, and, what is perhaps more important, the welfare of his more capable neighbor settlers, whose prosperity in part depends on his. The selection



Harvesting wheat on an irrigation project

law passed by Congress and the new regulations of the Reclamation Bureau are intended as a partial protection against these evil results, not as a check to pioneering.

The settler prepared to buy a substantial equity in a farm is still completely free to take a flier in reclamation farming, though he may lack experience and be unfit. He is gambling with his own money. But the reclamation homesteader who takes up an irrigated farm unit on little more than an application-fee payment is in a very different position; the Government is his partner. It has furnished him a piece of plant which cost \$5,000 or \$10,000 to build, and depends for repayment of this investment on the settler's chance of success in his farming. If the Government seeks to protect its gamble investment by making sure that the settler is one who has reasonable chances of succeeding, it is exercising only ordinary prudence.

The case at present rests on the demonstrated need for this prudence in reclamation development. Under the original reclamation law the free-for-all principle was assumed to control. The results have been disappointing financially—almost disastrous. The hope back of the present change of system is to take out of reclamation development some of the gamble responsible for these results.

WANTED: SELECTED FARMERS

From the Boise Statesman

THE Reclamation Bureau from now on will restrict settlement on public lands to men with knowledge of farming and enough money to finance their undertaking.

When the western country was reclaimed and settled there were comparatively few failures. The idea grew that anybody could make a living on the reclaimed land of the West. As a matter of fact, however, about 95 per cent of the settlers were farm men, farm raised. They knew the conditions of farming and were willing to meet them and dig a living out of the soil.

When stories of the prosperity of these farmers went over the Nation men flocked to the projects from the cities, bringing with them gas ranges, electric sewing machines, and electric irons. The women had never seen a chicken with its feathers and the men could not harness a horse or milk a cow. They brought failure and misery to the projects of the West. They left hopeless and bitter.

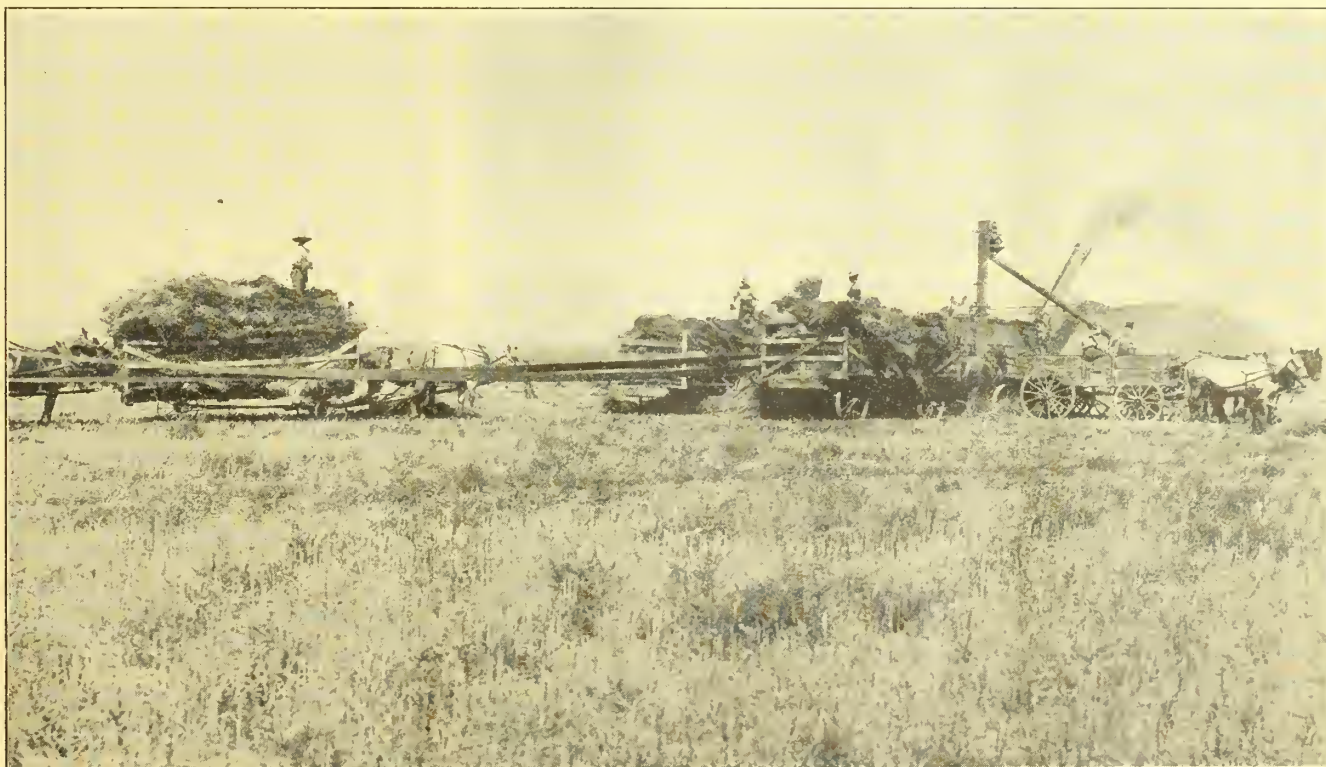
The Dominion of Canada is solving its problem of city-bred farmers by providing schools in which the settlers may learn at least the first principles of agriculture.

Inexperienced men of this country who think they would like to ranch on irrigation projects would profit by going through a two-year apprenticeship with some successful farmer before they attempted the management of a farm of their own. Then they would know how to go about the business and would know whether they had a liking for it.

Farming is becoming more and more a technical profession. A farmer to-day must be business man and mechanic, stock grower and horticulturist. He must work, and think while he is working. The price of stupidity or indolence is failure.

Western projects have had enough of city-bred farmers with only a desire. They are too liable to failure and failures are a liability. If, by reasonable limitations, the bureau can reduce the number of failures it will receive the cooperation of the West.

Animals even of the finest breeding, although given the best feeds in correct proportions, will not make a profit for the feeder if they are not properly cared for and kept in good health.



Threshing on the Lower Yellowstone project, Montana-North Dakota

BAKER PROJECT NEEDS FURTHER CONGRESSIONAL ACTION

Attorney General Sargent advises Secretary of the Interior that it is his duty to withhold the beginning of construction until Congress has opportunity to give further consideration to project's feasibility

IN reply to a letter from the Secretary of the Interior requesting an opinion concerning certain questions in connection with the appropriations for the Baker project, Oregon, the Attorney General, under date of September 17, 1925, wrote as follows:

I have the honor to reply to your letter of July 22, 1925, relating to the Baker reclamation project in Oregon, wherein you state that by the act of March 3, 1925 (43 Stat. 1141, 1168), Congress provided "For investigation, commencement of construction, and incidental operations, the unexpended balance of the appropriation for this purpose for the fiscal year 1925 is reappropriated and made available for the fiscal year 1926," and request an opinion upon the following question:

is provided, and in section 2 the Secretary of the Interior is authorized and directed to make examinations and surveys for, and to locate and construct, irrigation works, and to report at each session of Congress "all facts relative to the practicability of each irrigation project." In section 4 it is provided "That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same * * *." By section 10 the Secretary of the Interior is "authorized to perform any and all acts and to make such rules and regulations as may be necessary to prepare for the purpose of carrying the provisions of this act into full force and effect."

By section 16 of the act of August 13, 1914 (38 Stat. 686-690), it was provided:

such purposes shall be paid out of the reclamation fund provided for by the reclamation law.

It will be noted that whereas under section 2 of the act of June 17, 1902, supra, the Secretary of the Interior was authorized both to select and to construct new projects without additional legislation by Congress, section 16 of the act of August 13, 1914, requires that such expenditures must first be authorized by an appropriation by Congress. Section 16 did not, however, relieve the Secretary of the duty imposed by section 2 of the act of June 17, 1902, to report at each session of Congress "all facts relative to the practicability of each irrigation project," nor did it relieve him of the duty imposed by section 4 of the act of June 17, 1902, to determine the practicability of irrigation projects before the letting of contracts.

The duties of the Secretary as to new projects in this respect are again specified in an amendment to the reclamation law by subsection B of section 4 of the second deficiency act, fiscal year 1924 (43 Stat. 701), passed on December 5, 1924, which provided:

That no new project or new division of a project shall be approved for construction or estimates submitted therefor by the Secretary until information in detail shall be secured by him concerning the water supply, the engineering features, the cost of construction, land prices, and the probable cost of development, and he shall have made a finding in writing that it is feasible, that it is adaptable for actual settlement and farm homes, and that it will probably return the cost thereof to the United States.

The application of this provision to the Baker project depends upon whether or not the Baker project may be considered a "new project" within the meaning of the section. In one sense the Baker project is not a new one, inasmuch as appropriations have been made for it each year since 1922, as follows:

For investigation, commencement of construction, and incidental operations, \$400,000. (Fiscal year ending June 30, 1923, act of May 24, 1922, 42 Stat. 552, 585.)

For investigation, commencement of construction, and incidental operations, \$500,000. (Fiscal year ending June 30, 1924, act of January 24, 1923, 42 Stat. 1174, 1207.)

For investigation, commencement of construction, and incidental operations, the unexpended balance of the appropriation for this purpose for the fiscal year 1924 is made available for the fiscal year



The first crop

If after investigation I come to the conclusion that the Baker project is not a feasible project, does existing law make it my mandatory duty to begin the construction of the project notwithstanding the conclusion on my part that it is not feasible.

In other words, under existing law, am I compelled to construct the Baker project regardless of its feasibility?

A consideration of the statutes prescribing the duties of the Secretary of the Interior discloses that by the act of June 17, 1902 (32 Stat. 388, et seq.)—constituting the organic act for reclamation projects—a continuing reclamation fund

That from and after July first, nineteen hundred and fifteen, expenditures shall not be made for carrying out the purposes of the reclamation law except out of appropriations made annually by Congress therefor, and the Secretary of the Interior shall, for the fiscal year nineteen hundred and sixteen, and annually thereafter, in the regular Book of Estimates, submit to Congress estimates of the amount of money necessary to be expended for carrying out any or all of the purposes authorized by the reclamation law, including the extension and completion of existing projects and units thereof and the construction of new projects. The annual appropriations made hereunder by Congress for

1925. (Fiscal year ending June 30, 1925, act of June 5, 1924, 43 Stat. 390, 418.)

For investigation, commencement of construction, and incidental operations, the unexpended balance of the appropriation for this purpose for the fiscal year 1925 is reappropriated and made available for the fiscal year 1926. (Fiscal year ending June 30, 1926, act of March 3, 1925, 43 Stat. 1141, 1168.)

As indicated by the language of each of the foregoing appropriation acts, and as more fully shown by the hearings before the subcommittees of the House Committees on Appropriations for the Interior Department (see Hearings, fiscal year 1924, pp. 645, 646; fiscal year 1925, pp. 949-996; fiscal year 1926, pp. 483-487), the project was under investigation during that period, and upon the expiration of each fiscal year without construction having started, each appropriation substantially lapsed and the project came to an end. Consequently, each subsequent appropriation constituted a new designation by Congress of the project, and as the second deficiency act was passed December 5, 1924, and the appropriation for the Baker project for the fiscal year 1926 was passed March 3, 1925, it would seem clear that in point of time the Baker project is a "new project" within the meaning of and is controlled by said subsection B. Furthermore, irrespective of the date of original designation, the Baker project is a new project within the purpose of said subsection B in that construction is not yet started, and it was the intention of Congress in subsection B to require all projects thereafter approved by the Secretary of the Interior for the beginning of construction to be based upon findings in writing by the Secretary that they are feasible.

The conclusion that construction should not begin if the project is not feasible is, so far as the Baker project is concerned, in harmony with the attitude of the subcommittee of the House committee during the hearings upon the Interior Department appropriation bill for the fiscal year 1925, when the chairman, in discussing the Baker project, said:

As I have suggested this morning, Commissioner Davis, if, following the designation of a project by Congress, the Reclamation Service should secure new information which gives it reason to relieve that the project is not feasible, I think the service would do the right thing to defer action until Congress can be made acquainted with the facts, and then Congress may make the decision. (Hearings, p. 949.)

This department has had occasion, from time to time, to pass upon situations analogous to the instant one. By the act of March 3, 1893 (27 Stat. 646, 661), Congress provided:

For the purchase of grounds and the erection thereon of a penitentiary, in the State of Washington, under the direction and supervision of the Secretary of the Interior, and upon such tract or parcel of land in said State as shall be designated by said Secretary, thirty thousand dollars.

The appropriation was in fulfillment of a promise made in behalf of the State of Washington in the enabling act of February 22, 1889 (25 Stat. 676, 680), under which the State had been admitted to the Union. It developed that in the interim between 1889 and 1893 the State had built its own penitentiary, and in view of this

situation, upon request of the Secretary of the Interior for an opinion, this department advised as follows:

But as I am advised that Washington already has a penitentiary it seems to me the attention of Congress should be called to the matter before any further expenditure of money is made. (21 Op. Atty. Gen. 352, 353.)

In the matter of the construction of battleship No. 34 at the Government navy yard at New York, the Appropriation therefor was restricted to \$6,000,000. The Secretary of the Navy found that the appropriation would not be sufficient, and in response to his request for an opinion as to the course to be followed, this department said:

It follows, therefore, that if you are of the opinion that a battleship of the character contemplated by Congress can not be built at a Government navy yard within the limitation as to cost fixed by the act, it would be improper to proceed further in the matter without additional legislation by Congress. (28 Op. Atty. Gen. 477, 483.)

I have the honor to advise you, therefore, that I am of opinion that if you "come to the conclusion that the Baker project is not a feasible project," existing law does not "make it (your) mandatory duty to begin the construction of the project, notwithstanding the conclusion on (your) part that it is not feasible." On the contrary, I believe it is your duty to withhold the beginning of construction, and to lay the matter before Congress for such action as it may deem proper.

Great quantities of inferior hay, grain, and roughage for which there is no ready market may be fed, with advantage, to livestock.

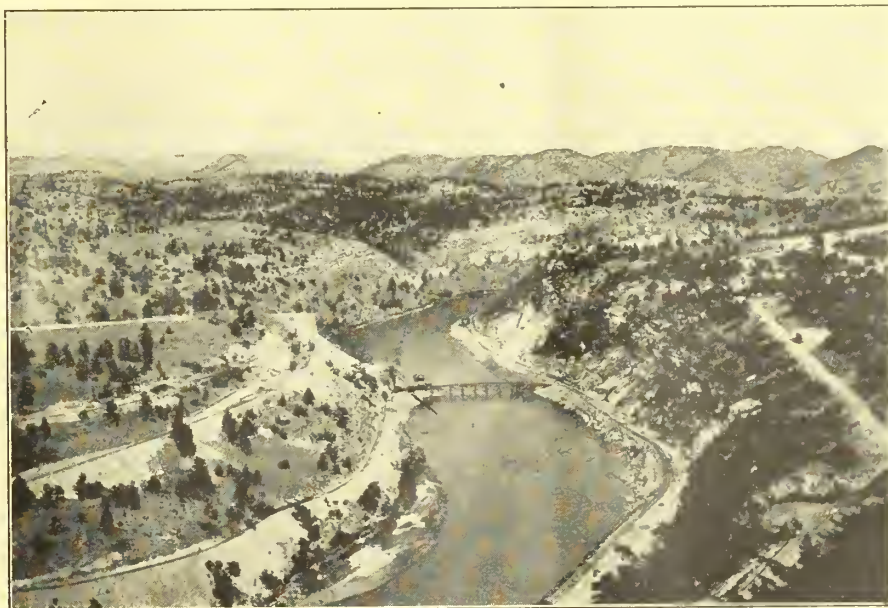
SETTLEMENT MEETING AN ASSURED SUCCESS

Every indication points to the fact that the meeting called by Commissioner Mead for December 14 and 15 to discuss settlement and development problems of the Bureau of Reclamation will prove of even greater interest and be more conducive of beneficial results than was at first anticipated.

Acceptances continue to pour in from representatives of the railroads, of the agricultural colleges, and of other organizations interested in this phase of rural development.

Steps are being taken to make the program a notable one. Secretary Work and Secretary Jardine will address the conference. An illustrated talk will be given by Commissioner Mead. Numerous other features are contemplated.

A full description of the conference will appear later in the NEW RECLAMATION ERA.



The site of Guernsey Dam, under construction on the North Platte project, Nebraska-Wyoming

LOWER KLAMATH LAKE, KLAMATH PROJECT, OREGON

Investigation of economic conditions by committee of experts finds that lands of lake bed are of little agricultural value, and that it might more properly and beneficially be used as a drainage sump

DURING the latter part of the summer an investigation of the soils and conditions of the lower Klamath Lake region, Klamath project, Oregon, supplemented by extended studies of reports of previous investigations, was made by a committee comprising Charles F. Shaw, professor of soil technology of the University of California; Macy H. Lapham, associate soil technologist of the Department of Agriculture; and W. L. Powers, soil specialist of the Oregon Experiment Station. The conclusions and recommendations in their report are as follows:

CONCLUSIONS

The lands of the lake bed are of little agricultural value, and it is our unanimous opinion that the lake bed proper is unsuited to permanent agricultural use.

The tule lands on the north and west sides of the lake bed are of fair agricultural value and will probably warrant the cost of reclamation. The tule lands of the east side appear to have a higher content of alkali and to be of less productive value. They probably can not now carry the cost of reclamation and development.

The lands of the Oregon drainage district are being developed with reasonable assurance of success on the peat soil and a probability of failure on the smaller area of lake bed. The lands of the Sheepy Lake and Oklahoma regions are being developed, and the lands irrigated by Willow, Cottonwood, and Sheepy Creeks are producing forage crops and some grain.

Alkali is present throughout the entire area, and injurious concentrations occur in the vicinity of Miller and White Lakes and in other localities. Black alkali may develop unless the soils are well drained and leached.

Drainage is inadequate. Deep drains, necessitating pumping over the straits or into a diked sump, are essential for permanent reclamation.

Surface irrigation is considered an essential for permanent agriculture, with a net duty of 12 to 18 inches depth of water.

The tule or peat lands are combustible and when dry are in danger of destruction by fire. Practically all the peat lands in California are dried and in serious danger of destruction, with large areas already burned off to depths of 2 to 5 feet, often to the clay subsoil. Controlling or extinguishing a fire is never simple and is

especially difficult when the land is in diverse holdings. Irrigation and drainage systems should be planned with the fire hazard in mind and with provision for preventing the spread of fires.

Crops suitable to the soils at this elevation and under the existing climate are grasses and clovers, with some hardy vegetables. Forage crops can be grown, necessitating a stock or possibly a dairy industry to provide a market.

Agricultural, economic, and social conditions preclude close settlement on the peat and call for development of these lands in farm units of considerable size, with buildings limited to those necessary for "camps," or located on the adjacent high lands.

RECOMMENDATIONS

It is recommended that a drainage sump be established by constructing a levee from a point on the foothill in the vicinity of Brownell northerly to the State line or beyond, thence easterly to the uplands, a probable total distance of about 10 miles. The levee should be of sufficient height to impound water up to the 4,080-foot level. This would provide a sump sufficient to impound all the drainage from the peat lands (keeping the water level in the ditches at 6 feet below the surface) and also care for the flood water from the hill lands.

The water in this sump, seeping into the peat lands on the east side, would in a degree protect them from fire and would moisten them sufficiently to produce a growth of plants that might afford considerable pasturage. If the drainage and flood waters do not maintain sufficient water in the lake to afford reasonable protection to these peat lands from fire, water sufficient for this purpose should be admitted through the straits. The entire lake bed should be covered by water each spring to a level between 4,078 and 4,079 foot elevation.

The establishment of this sump, comprising nearly all of the bed of lower Klamath Lake in California, would not only provide a means of disposing of drainage waters from the reclaimed peat lands, and to a degree protect the peat lands from fire, but it would also reestablish a considerable body of water for bird life. The pasturage of the weed growth on the lake bottom that was available in 1924 and 1925, would be reduced, but the production of grasses and weeds on the unreclaimed peat lands should supply much more pasturage of a better quality.

We consider the lake bed to be unsuitable for agricultural use and that it may be more properly and beneficially used for other purposes. We therefore recommend that it be used as a drainage sump and again covered with water.

SOIL TREATMENT PROVES EFFECTIVE

THE Grandview Herald, Yakima project, Washington, tells in a recent issue how William Macfadden, who has an apple and Winter Nellis pear orchard 2 miles from Grandview, has demonstrated that great improvement in the productive quality and physical condition of the predominating volcanic ash soil of the district may be brought about by proper treatment.

Mr. Macfadden came to Grandview in 1913 without previous experience in orcharding. He observed the tendency of the soil to pack and bake under irrigation, and started at once to build up the soil by liberal applications of manure and by working in green cover crops. For this purpose he finds giant crimson clover the most effective.

In a short time the soil, which in its raw state refused to hold moisture for any

length of time, became loose and friable. In handling the cover crop, Mr. Macfadden mowed the crop once a year and piled the green fodder in the tree rows. Here it was allowed to decay, while the remainder of the crop was disked in where it grew.

The shallow soil in Mr. Macfadden's vicinity has a tendency to produce undersized fruit, but his efforts have been rewarded to such an extent that his apples and pears consistently run to exceptionally large sizes. In 1923 his Winter Nellis pears averaged larger than ordinary Bartlett's, several hundred boxes being more than 10 inches in circumference, with one pear attaining 13½ inches in circumference by actual measurement.

On several occasions his apple trees have supplied a considerable portion of the Grandview exhibit at the Yakima fair.

THE RIO GRANDE FLOODS OF 1925



Rio Grande just above El Paso, Tex., during the recent floods

THE Elephant Butte storage dam of the Rio Grande Federal irrigation project is located on the Rio Grande 120 miles above El Paso, in the State of New Mexico. The drainage area above Elephant Butte Dam is 30,000 square miles. Below Elephant Butte Dam there is a drainage area of 8,000 square miles in New Mexico subject to summer rainfall on surrounding mesas, the discharge from which reaches the Rio Grande below the dam through a large number of arroyos.

The largest measured discharge of the Rio Grande from upper river sources above the present site of the dam was 33,000 second-feet, which occurred in October, 1904. Previous to the floods of the present year the largest recorded discharge below Elephant Butte was approximately 8,000 second-feet. The rainfall on the lower drainage area during the month of September was the greatest of any record in the past 40 years. This occurred in the Black Range, to the west of the river, and produced a discharge in several of the large arroyos, which combined in the Rio Grande and resulted in a flow of 11,200 second-feet at Percha Dam.

Simultaneous with the rise at the Percha diversion dam discharges from other arroyos reached the river below and caused a rise at Leasburg diversion dam, which is 60 miles above El Paso and about the same distance below Elephant Butte. The combined discharge at Leasburg diversion dam measured 16,900 second-feet, and this amount continued for approximately 12 hours. At El Paso, Tex.,

the increased discharge was recorded at noon, September 1, and gradually reached a peak of 13,500 second-feet, which continued for four hours in the morning of September 3. These discharges are higher than any previous recorded discharge at Leasburg Dam and at El Paso, Tex., since the completion of the Elephant Butte storage dam in 1916. The Rincon Valley, which lies directly below Percha diversion dam, was only slightly affected by the flooded river condition. In the Mesilla Valley, which lies between Leasburg diversion dam and El Paso, an estimate of

the flooded area is about 4,500 acres, largely outside of the ordinary flood bank of the river and in low lands. Constructed lateral levees and other flood protection works were successful in preventing an overflow of a larger area in the Mesilla Valley. At El Paso the main Franklin Canal banks were overtopped in places and for a limited time an uncontrolled discharge passed down the canal, overflowing into a small area in the lower portion of the city of El Paso. In the southeastern portion of El Paso, in what is known as the Collingsworth and Sambrano additions, a large amount of damage was sustained to suburban homes by breaking of the city levee, and an area of 600 or 700 acres of well-improved suburban property was submerged in several feet of water.

Throughout the El Paso Valley several low-lying areas, particularly on the San Elizario Island, were overflowed and crop damage sustained. The total damage is estimated at between \$400,000 and \$500,000, over 50 per cent of which was sustained in homes and buildings in the lower portion of El Paso.

Exceptional and noteworthy measures were adopted by landowners and water users in the farming area in organizing emergency crews for levee raising and strengthening. A great deal of effective work was performed in this manner and prevented a much larger crop damage and loss to improvements. Army troops from Fort Bliss joined the city, county, and other agencies in quick response for flood emergency work, and at one time more than 1,000 men were engaged in patrolling and strengthening levee embankments.

Approximately 17,000 acres of the total

(Continued on page 174)



Growing cabbages in a pear orchard on the Rio Grande project, New Mexico-Texas

CROP AND LIVESTOCK CENSUS

Regulations

PERSONNEL.—The crop and livestock census for the year 1925 on Federal reclamation projects will be taken by employees of the bureau under the direction of the project superintendent. The methods employed will be similar to those followed during the years previous to 1924. (In 1924 the Bureau of Reclamation also took the census for the Bureau of the Census. This will not be done in 1925.)

Census forms.—The record forms to be used by the enumerator will be the usual Bureau of Reclamation Form 7-332, which has been modified to include information on purebred and scrub sires and the number of brood sows kept on farms. The Washington office of the Bureau of Reclamation has a supply of these forms on hand and the various projects should request the number required for this year. Old forms that may be on hand should not be used. The form enumerates most

varieties of crops produced and stock kept on Government projects. Blanks are provided on the form for listing additional items. Autos, trucks, and tractors should be listed and valued separately from other farm equipment which should be lumped and valued.

IRELAND PLANS FARMS SUBSIDY

A recent press dispatch from Dublin states that the Government of the Irish Free State proposes to grant a subsidy of \$15 an acre a year for all new land put under tillage. This action is to be taken to encourage the development of farming for other than domestic requirements. The Government is said to be prepared to back its plan to the extent of \$5,000,000.

At a conference of delegates of county agricultural committees, the plan was subjected to some criticism, on the ground that it was unjust that farmers who had hitherto entirely neglected tillage should receive a subsidy for the future, whereas those who had struggled with it through long years should be excluded from its benefits.

Accurate records.—The Bureau of Reclamation has found the crop and stock census data taken annually in past years to have great value for reference. Under the act of December 5, 1924, which provides for the repayment of construction costs on the basis of gross crop values, these census data become of paramount importance and should be collected with a great deal of care. The enumerators should interview the farmer and secure his cooperation if possible. Absentee owners and other conditions will necessitate the use of good judgment based on the best information obtainable. Form 7-332 should be dated and signed by the owner where possible, otherwise by the enumerator.

Supervisor.—The project superintendent shall be the supervisor of the census and shall appoint the enumerators and review their work. He will confer with the leading business men and water users of the district and will determine the values to be applied to the various crops. He will then have prepared, under his direction, the necessary summaries of all data collected.

Information shown.—The crop census shall show with respect to each farm the total number of irrigable acres, the number of acres of the various crops grown, the yields per acre, and the values of such crops. Supplemental data showing whether the crops were sold, fed, or stored should be given.

How to value.—Many farmers will not have sold their crops; then the enumerator shall place a value upon such crops in accordance with the unit prices as fixed in general by the supervisor; others will have fed hay and grain to livestock and the value of such crops shall be determined as if the crops had been sold. Hay, fodder, or other harvested forage shall be valued in the stack on the farm. Crops, such as grain, beans, potatoes, seeds, etc., shall be valued f. o. b. cars, shipping point, exclusive of the cost of containers. Fruits, berries, and vegetables shall be valued f. o. b. cars, shipping point, or warehouse, exclusive of the cost of grading, packing, storing, and containers. All factory crops, such as sugar beets, string beans, cucumbers, tomatoes, etc., shall be valued at the selling price to factories or dealers (including estimated bonuses) f. o. b. shipping point, when not delivered direct to the factory. Grain crops which were not harvested for hay or grain should be included as pasture. A distinction should be made in value between tame and wild irrigated pasture and the value should be a reasonable annual rental for such pasture. Straw, sugar-beet tops, hay and grain stubble, etc., and other by-products should be listed and valued. All gardens and miscellaneous crops should be listed and valued.

RIO GRANDE FLOODS

(Continued from page 173)

project area were overflowed. In the past years previous to the construction of Elephant Butte Dam three times this area has been subject to overflow with a smaller discharge.

Plans for river rectification throughout the El Paso Valley are receiving consideration from all interested agencies and endeavors are being made to remove the complications which arise through the international features involved, where the Rio Grande is the international boundary line between the United States and Mexico. Flood protection measures which in the past several years have been discussed with only ordinary interest most likely now will be vigorously adopted. The extension of the farming area has been so greatly increased in the past few years that former overflows of little consequence now are of greater moment on account of character of improvements and the rapid settlement which is taking place.

Total crop loss on account of the August and September floods to the project will be only on a small percentage of the project lands. The gross value of crop returns for the season of 1925 will be largely in excess of any heretofore produced and will most likely exceed the gross return of 1924, which was \$97 per acre for each acre cropped.

CONGRESSMAN SMITH LAUDS IDAHO CROPS

Congressman Addison T. Smith, of Idaho, believes that Idaho agricultural land is better than any elsewhere in the world. On his return from an extensive trip over the reclamation projects he is reported to have said:

Prosperity has come to Idaho. Our agricultural yields have increased enormously. Farmers are reaping the biggest crops they have seen in years, and incidentally they are paying off obligations which three years ago they thought they never would be able to meet.

There is every reason to believe that the West, and particularly Idaho, has completely recovered from the postwar deflation, and is once more on the threshold of a position of agricultural and stock-raising equality with any community the world over.

No project that I have seen has seemed as productive as the Boise reclamation project, and the people of Idaho are fortunate in having that area within their boundaries.

WATER USERS SAVED FURTHER SUM

THE act of December 5, 1924, provides "that the cost and expense after June 30, 1925, of the main office at Washington, District of Columbia, of the Bureau of Reclamation in the Department of the Interior, and the cost and expense of general investigations heretofore and hereafter authorized by the Secretary, shall be charged to the general reclamation fund and shall not be charged as a part of the construction or operation and maintenance cost payable by the water users under the projects."

The cost of the Washington office and special investigations authorized by the Secretary, by fiscal years, for the last five years is given in the following table:

1921.....	\$225, 110. 57
1922.....	170, 830. 34
1923.....	150, 670. 08
1924.....	184, 345. 37
1925.....	162, 215. 81
Total.....	893, 172. 27

This is an average annual cost for this period of \$178,634.45. Under the former method of prorating these charges, the various projects were charged during the

fiscal year 1925 approximately as shown in the accompanying statement:

State	Project	Amount
Arizona-California	Yuma.....	\$7, 750
	Yuma Auxiliary.....	1, 100
California.....	Orland.....	850
Colorado.....	Grand Valley.....	5, 150
	Uncompahgre.....	3, 450
Idaho.....	Boise.....	7, 650
	King Hill.....	1, 000
	Minidoka.....	3, 650
	American Falls.....	18, 700
Montana.....	Huntley.....	1, 200
	Milk River.....	3, 200
	Sun River.....	2, 400
Montana-North Dakota.....	Lower Yellowstone.....	1, 950
Nehraska-Wyoming	North Platte.....	21, 800
Nevada.....	Newlands.....	5, 300
New Mexico.....	Carlsbad.....	1, 000
New Mexico-Texas.....	Rio Grande.....	12, 000
North Dakota.....	Williston.....	1, 150
Oregon.....	Umatilla.....	10, 150
Oregon-California.....	Klamath.....	8, 000
South Dakota.....	Belle Fourche.....	2, 250
Utah.....	Strawberry Valley.....	1, 650
Washington.....	Okanogan.....	1, 200
	Yakima.....	15, 150
Wyoming.....	Riverton.....	8, 550
	Shoshone.....	6, 250
	Secondary projects and investigations.....	9, 700
Total.....		162, 200

Assuming that the average annual cost of the Washington office will be \$175,000, the provision of the act of December 5, 1924, quoted above, will result in an

IRRIGATED PASTURE FINE FOR DAIRYING

The idea that irrigated land is too valuable for pasture is evidently disappearing, according to the numerous inquiries concerning pasture for cows received at the irrigation branch experiment station at Prosser, on the Yakima project, Washington.

Numerous irrigated pastures have been carrying from one to three cows per acre from six to seven months each year. Owners of good pasture estimate that an acre of grass is worth fully as much as an acre of alfalfa hay, soil and fertility considered. Experience at the Irrigation Station indicates that well-managed pasture on good land is highly satisfactory.

Cows are effective stabilizers in many communities. The extensive use of pastures in most of the leading dairy regions is significant. Grass is a natural feed for cattle, and important in health as well as in nutrition.

annual saving to the water users of amounts approximately as shown above.

Special investigation under subsection K of the act of December 5, 1924, by the board of survey and adjustments, for which Congress appropriated \$150,000, are now in progress. The cost of these investigations will be borne by the general reclamation fund.

BOARDS APPOINTED TO SELECT SETTLERS

Subsection C of the act of December 5, 1924, provides for the selection of settlers on public land, based on qualifications as to industry, experience, character, and capital. The act authorizes the Secretary of the Interior to appoint boards, in part composed of private citizens, to assist in determining such qualifications. Regulations governing the selection of settlers under this act were printed in the October issue of the NEW RECLAMATION ERA.

At the time of going to press the following boards had been appointed:

Klamath project.—W. C. Dalton, Malin, Oreg.; C. A. Henderson, Klamath Falls, Oreg.; H. D. Newell, Klamath Falls, Oreg.

Grand Valley project.—M. G. Hinshaw, Route 4, Grand Junction, Colo.; W. A. Knapp, Mack, Colo.; J. C. Page, Grand Junction, Colo.

Uncompahgre project.—L. J. Foster, Montrose, Colo.; W. G. Merritt, Delta, Colo.; J. J. Tobin, Montrose, Colo.

All these boards will serve without compensation, other than the personal satisfaction of helping materially to build up the community.

PROFITS FROM THE DAIRY COW

THE dairy farmer stands to make a profit. A profit can be defined as a surplus above the cost, including his own wages, of conducting his farm.

Usually crop farmers get off well if they manage to cover their wages; not usually do they put financial fat on their bones, nor escape the responsibility incident to paying their debts throughout their lives. Their production begins and ends with production of raw materials.

There is, however, one universal lesson to be drawn from the industrial world. The producer of raw material gets wages; while the manufacturer gets a salary, and in addition as a reward for the employment of capital, a profit. His possession or control of the capital his business requires, is either a result of saving or a consequence of having a reputation for honesty and thrift. And any farmer can by the use of honesty and thrift command the use of sufficient capital to become a manufacturer—a manufacturer of his own raw materials for which his cows are his machinery.

Profit from use of machinery is always legitimate, usually substantial, and, reading from statistics, seldom lacking. Machinery is a tool for accomplishing the work of many hands by means of ingenious devices. The ingeniousness of men necessary to devise machinery is a rare quality and is recognized in patents and in the monopoly of patents. The farmer, whose ingeniousness enables him to select the best cows and make the best use for his by-product, manure, devises thereby the best manufacturing machinery for his crops and, other things being equal, makes the best profits.

He therefore enjoys something beyond his wages. This profit accumulated and saved becomes his capital and the means of retirement when age prompts it, the source of ease when age compels it, the means for starting his children in conditions above his own when their enterprise merits it.

We therefore recommend dairy farming for every enterprising farmer who would take advantage of his opportunities.

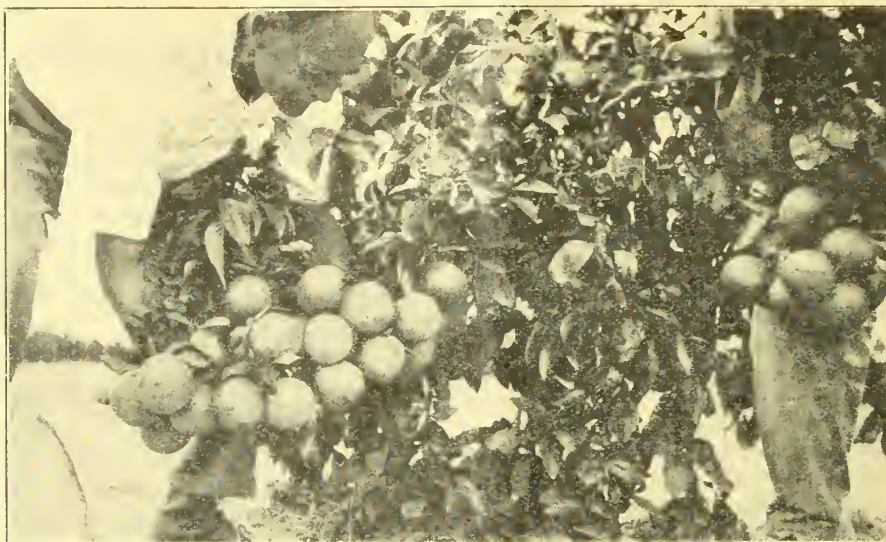
NEW RECLAMATION ERA

ISSUED monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

Sent regularly to all water users on the reclamation projects under the jurisdiction of the bureau who wish to receive the magazine.

To other than water users the subscription price is 75 cents a year, payable in advance.

Subscriptions should be sent to the Chief Clerk, Bureau of Reclamation, Washington, D. C., and remittance in the form of postal money order or New York draft should be made payable to the Special Fiscal Agent. Postage stamps are not acceptable in payment.



A 2½-year old grapefruit tree on the Yuma Mesa

KLAMATH COUNTY FAIR, 1925

THE annual Klamath County fair was held in Klamath Falls, Oreg., on September 3, 4, and 5.

C. A. Henderson, county agent, states that from the standpoint of exhibits the fair this year showed the largest increase and was the most successful to date. Livestock exhibits were not up to normal, but this was more than balanced by the large display of farm products. Owing to the prevailing low price of hogs during the last few years until the past six months, the hog exhibit was the smallest in the history of the fair. Sheep exhibits were slightly smaller than last year.

The exhibit of beef cattle was better balanced than ever before, quality show-

ing marked improvement. Dairy cattle were slightly less than last year, the total entries numbering 76 head. The quality was better than usual and better care was given those exhibited. The main livestock barn was practically filled with beef and dairy cattle.

Classes of baby beef were shown for the first time in the history of the fair. The two winning animals were sold at public auction and brought 17 and 11 cents per pound, respectively.

The poultry exhibit, numbering 100 entries, was by far the best ever shown. One hundred and twelve new collapsible-wire double-exhibit cages were purchased by the fair board, making as fine an exhibit for the department as any county fair in the State. A rabbit department was also added this year, showing 40 head of purebreds and a score of utility rabbits.

The display of farm crops and fruit was exceptionally good, the number of entries over previous fairs being double in these departments. The quality of all produce was considerably above normal in every respect. Sugar beets weighing from 4 to 6 pounds were exhibited in large quantities. This is the first year that the growing of this crop has been undertaken.

However, perhaps the outstanding exhibit of the entire fair was the potato booth, inaugurated this year for the first time. In addition to a large number of exhibitors showing 15-pound lots, 18 sacks of hand-picked commercial Netted Gem potatoes were shown in competition for special prizes aggregating more than \$250. This division was judged by two judges,

who were unanimous in their opinion that it was the finest potato exhibit ever shown in the State of Oregon.

Prizes were offered this year by the fair board for the first time on the community booths, resulting in five communities in the county entering this contest. The booth displays were exceptionally good, considering this was the first year it was attempted.

A great diversity of products was shown in some of the booths, ranging from all kinds of fruits and vegetables to grains, grasses, clovers, and other farm products of every description produced in temperate climates.

Club work showed a 50 per cent improvement in the number of exhibitors, and the quality was exceptionally good. Domestic science and art, culinary service and flowers, all showed well-balanced exhibits, improving in quality and quantity over previous years.

YAKIMA VALLEY CROPS GIVE GOOD RETURNS

The returns this year from farming operations in the Yakima Valley are reported as wonderful in many respects. Excellent yields are the rule rather than the exception. Listen to this one about the lowly spud:

Records for potato acreage returns are being broken right along this season at Sunnyside, with Ray Van de Veer as the latest to report an exceptional yield. Mr. Van de Veer was paid \$2,319 for his crop from 4 acres, an average of \$579 for each acre. The land was not especially prepared or heavily fertilized and received only ordinary attention.

Figure out what he would have made if he really had gone after a crop.

ANCIENT APPLE TREE GROWS RECORD FRUIT

Apples grown on a 26-year-old Rome Beauty tree on the Yakima project, Washington, and taking only 26 to fill a box, were displayed recently by the horticultural union. The apples were grown by M. N. Richards. On an average they measured 15¼ inches in circumference and weighed 1½ pounds.

T. S. Johnson, advertising manager of the union, used these apples as proof that old trees, properly cared for, can produce apples equal in size to those grown on any young tree. Right fertilization, combined with proper pruning and thinning, it is maintained, will keep the standard of fruit grown on the old trees equal to that grown on any.

NEW RECLAMATION ERA

VOL. 16

DECEMBER, 1925

NO. 12



HARVESTING HAS BEEN COMPLETED OF LARGE AND, IN GENERAL, PROFITABLE CROPS ON THE IRRIGATION PROJECTS

CREDIT

THE credit problem of the farmer does not depend solely upon the availability of credit institutions that provide funds for farmers. Credit is based not only upon the security that is offered for loans but quite as much upon the character and ability of the borrower. It is important, therefore, that farmers so conduct their business that they establish good credit standing. Prompt repayment of loans when due, the efficient organization and management of the farm, and reputation for honesty and integrity are all important factors in giving farmers a good credit rating.

NEW RECLAMATION ERA

Issued monthly by the Bureau of Reclamation, Department of the Interior, Washington, D. C.

HUBERT WORK
Secretary of the Interior

ELWOOD MEAD
Commissioner, Bureau of Reclamation

Vol. 16

DECEMBER, 1925

No. 12

HIGH LIGHTS IN A REVIEW OF THE MONTH

BOISE PROJECT water users voted recently on the organization of the Boise-Kuna irrigation district, embracing about 45,300 acres of project land with a full Government water right and about 1,700 acres of New York Canal and Colonization Co. lands with a supplemental water right in Arrowrock Reservoir. The vote for the organization of the district resulted in 745 in favor and only 27 against.

IT is reported that the Southern Pacific Co. has granted an emergency freight rate on alfalfa hay in carload lots from Reno and Fallon, Newlands project, to eastern markets, effective December 15, 1925, for a period of six months. This should aid in disposing of surplus hay.

REPRESENTATIVES of a large milk-condensing concern are understood to have been making an examination of the Newlands project with a view to establishing a plant or entering the local market for whole milk. With the number of producing dairy animals increasing very rapidly, the time for the establishment of a milk condensery is considered opportune.

CARS loaded on one day at Grandview, Yakima project, included 17 cars of hay, containing 221 tons, valued at \$16 a ton; 20 cars of apples, holding 15,120 boxes, estimated at \$1.75 each; and 36 cars of potatoes, a load of 720 tons, with prices quoted at \$80 a ton. The value of this day's shipment alone would be \$3,536 for the hay, \$26,460 for the apples, and \$57,600 for the potatoes.

AFALL festival and fair was held on the King Hill project recently, at which a most complete exhibit was made of farm products. Garden vegetables of almost every variety known to the climate were exhibited, including some very fine specimens of melons. A large number of

varieties of apples of excellent quality were shown. The livestock exhibited was all of good quality and showed the effect of good care. The canned and baked goods sections contained a very interesting and instructive display, as also did the embroidery and needlework departments.

THE majority of the water users generally are in better financial circumstances at the close of this year than they have been at any time since 1921. These conditions lead to a better attitude and feeling toward the United States, and it can safely be predicted that with another year or two of similar success the financial condition of many of the water users, which for the past four years has been somewhat precarious, will be greatly improved and more firmly established.

FIVE bids were received for the purchase of the Williston project, the highest being from the United Power Co., of Crosby, N. Dak., of \$151,388, to be paid in 20 annual installments of 5 per cent each, with interest at 6 per cent. The sale has been authorized by the Secretary.

ATRIP was made recently by Superintendent Preston and others of the Yuma project to the lower Imperial Valley to inspect rice growing with a view to the possible introduction of this crop on the project in order to further stimulate leaching out of the salt lands on the project.

ADVANCE reports concerning the experimental growing of cotton on the Orland project were favorable. A complete report on the crop will appear later in the NEW RECLAMATION ERA.

THE tomato harvest on the Grand Valley project was the largest in the history of the local canning companies and taxed their facilities to the limit. One company in Grand Junction preserved

175,000 cases of tomatoes, 200 tons of pumpkins, 500 tons of apples in the form of apple butter, and a large quantity of string beans. A feeling of optimism is very apparent on the project.

THE Newlands project has enjoyed one of the most prosperous potato seasons in the history of the State. Cantaloupe growers were well pleased with the returns from melons, particularly in the Fernley district.

THE cotton yield on the Rio Grande project was the best in the history of the project. The crop matured two or three weeks earlier than usual and opened up unusually well.

HARVESTING has been completed on the Yakima project of probably the most abundant and profitable crops ever raised in the valley. The returns from potatoes were unusually favorable, with war-time prices prevailing. The shipment of farm products for October exceeded that of any previous month in the history of the project, with all warehouses packed to capacity.

THE price of 63 cents a pound for butterfat on the Orland project was the highest paid to project dairymen for the past five years.

TURKEY buyers on the North Platte project were preparing to ship 10 or more cars of dressed turkeys from the valley. Prospects on the Newlands project were excellent for the profitable disposal of an unusually large crop of these holiday birds.

THE Powell Creamery, Shoshone project, purchased in October 6,400 pounds of butterfat and manufactured 8,000 pounds of butter and 100 gallons of ice cream. Other agencies purchased 3,300 pounds of butterfat, the price of which at the end of the month was 48 cents.

MARKETING OF CROPS AND LIVESTOCK PRODUCTS

What the projects are doing to increase the efficiency of their methods in growing and disposing of their crops through cooperative organizations and concerns for changing raw products into a more concentrated form

IN order that the Bureau of Reclamation and the water users might have readily available data to be used as the basis for a comprehensive plan to foster better marketing methods on the projects and the production of crops from which the largest returns may be obtained, the project superintendents were requested recently to furnish the following information:

1. List of cooperative organizations or groups of farmers associated for marketing agricultural products.

2. List of organizations or individuals who contracted during the past year with the water users for growing specified crops, and the acreage and value of crops so contracted.

3. List of manufacturing concerns on the projects for changing raw products into more concentrated form, such as creameries, cheese factories, sugar-beet factories, canneries, alfalfa meal mills, cotton gins, etc.

A number of projects have furnished the requested information and this is summarized in the following statements, a study of which will indicate the projects making the most of these aids to crop growing and marketing and where improvements can be made:

COOPERATIVE ORGANIZATIONS

Yuma project, Arizona-California.—An association for marketing alfalfa, hay, seed, and straw; a cooperative association for marketing cottonseed, whose aim is to hold up the price of the seed and to fatten cattle with the seed or meal whenever the conditions are favorable; an association for growing and packing vegetables and melons, but not for marketing.

Orland project, California.—An almond growers' exchange; an orange growers' association; a prune and apricot growers' association; a fig growers' association; a cheese and butter company; a milk producers' association.

Uncompahgre project, Colorado.—Three potato growers' associations; a livestock and produce company; a community flour mill.

Boise project, Idaho.—Two creameries; an egg producers and creamery company; an equity exchange.

King Hill project, Idaho.—There are no cooperative organizations or groups of farmers on the project associated for marketing agricultural products.

Minidoka project, Idaho.—Wool growers' association; cooperative potato mar-

keting association; egg producers' association; honey producers' association.

Huntley project, Montana.—No such organizations on the project.

Lower Yellowstone project, Montana-North Dakota.—Four farmers' grain elevators; a dairymen's association.

North Platte project, Nebraska-Wyoming.—Two farmers' unions; beet growers' association; cooperative potato growers' association; cooperative cheese company; poultry association.

POTATO GROWERS MAKE EXCEPTIONAL PROFITS

Yakima Valley potato growers have struck a veritable Klondike in the sale of the lovely spud this year. With the Nation's crop thousands of carloads short, buyers have been flocking to Yakima, with the result that prices have soared to unexpected heights. At the end of October prices had reached \$57.50 per ton, with prospects of going higher.

One water user is reported to have harvested \$1,200 worth of potatoes from his patch of 1½ acres, and at that sold his crop \$10 a ton under the latest quotation.

Growers in the Grandview-Sunny-side district have for the most part raised bumper crops of potatoes, and those who have been fortunate enough to hold their crop expect to realize an excellent profit.

The crop of 6,500 carloads, or 120,000 tons, is expected to bring the farmers of the valley the highest total in cash in the history of the project, amounting probably to more than \$5,000,000.

Carlsbad project, New Mexico.—A ginning company, composed of 40 farmers associated for the purpose of ginning and marketing cotton and cottonseed. It is proposed to extend the operations to alfalfa products.

Umatilla project, Oregon.—A melon growers' association; an association of poultry producers, of which most of the poultry raisers on the project are members; a growers' association which has an agreement with a Washington association to market asparagus, potatoes, and strawberries grown on the project by members of the association.

Klamath project, Oregon-California.—Farm bureau exchange; potato growers'

association; poultry producers' association; wool producers' association. None of these organizations are extremely active, but are working more toward standardization than actual marketing.

Belle Fourche project, South Dakota.—There are no organizations on the project that function primarily as agencies for marketing agricultural products. Associations of alfalfa-seed growers, certified seed-potato growers, and for the marketing of wool have, however, been the means of disposing at times of a small portion of the products raised on the project.

Strawberry Valley project, Utah.—Three fruit growers' associations (no fruit shipped this season); a dairy association; two wheat growers' associations (inactive); two marketing associations; a poultry association.

Okanogan project, Washington.—A growers' union; a cooperative warehouse; a growers' warehouse company.

Yakima project, Washington.—Four fruit growers' associations; fruit exchange; horticultural union; grape growers' union; two cantaloupe growers' associations; cantaloupe exchange; a growers' association; dairymen's association; sweet potato exchange; beekeepers' association.

Shoshone project, Wyoming.—An association for the cooperative marketing of crops and livestock products.

CROP CONTRACTING ORGANIZATIONS

Yuma project.—A commission house contracted with growers of melons and lettuce and handled the produce on a commission basis. The acreage and returns were as follows:

Crop	Acreage	Gross returns
Lettuce.....	200	\$50,000
Watermelons.....	200	30,000
Cantaloupes.....	400	56,000

The net returns on lettuce and watermelons were quite satisfactory, but the cantaloupe crop was considered to be very poor.

Orland project.—No crops contracted for.

Uncompahgre project.—A sugar company contracted for 5,500 acres of sugar beets, the gross returns from which are estimated at \$385,000. A canning company contracted for 2,000 acres of string beans, with estimated gross returns of \$45,000. Some acreage was also planted to alfalfa seed and cucumber seed under contracts with seed companies.

Boise project.—There are no organizations or individuals on the project who contracted during the past year with the water users for growing specified crops. There are, however, a large number of fruit, vegetable, and seed buyers who either maintain permanent headquarters on the project or who have representatives there during the shipping season. Three concerns buy clover and alfalfa seed. Two fruit companies are heavy buyers and shippers of fresh fruits. Two packing companies have cold-storage plants for packing and shipping poultry.

King Hill project.—No crops contracted for.

Minidoka project.—A sugar company contracted for 8,000 acres of sugar beets at \$6 per ton; 200 acres of potatoes were contracted at 65 cents per hundredweight.

Huntley project.—A sugar company contracted for the growing of 4,669 acres of sugar beets. The contract price of beets is \$6.50 per ton, and an average yield of about 10 tons per acre will be harvested, which will return \$303,485 to the water users.

Lower Yellowstone project.—A sugar company contracted for 7,500 acres of sugar beets, estimated to return \$500,000. A pickle company contracted 550 acres of cucumbers, with an estimated return of \$20,000. A seed company contracted 1,850 acres of seed peas, estimated to return \$50,000.

North Platte project.—Two sugar companies contracted 63,000 acres of sugar beets, estimated to return a crop valued at \$4,851,000. A pickle company contracted 500 acres of cucumbers, with an estimated return of \$40,000. A seed company contracted 18 acres of cucumber seed. The above crops are produced in the valley, but not all on the project.

Carlsbad project.—No crops contracted for.

Umatilla project.—No crops contracted for.

Klamath project.—The acreage of potatoes contracted amounted to 1,000 acres, with an estimated value of the crop of \$100,000. Wool to the value of \$240,000 was contracted. A sugar company contracted 500 acres of sugar beets, with an estimated crop value of \$40,000. Contracts were made with lettuce growers for 100 acres, with an estimated crop value of \$20,000. Some hay and grain acreage was also contracted, but definite figures are not available.

Belle Fourche project.—A sugar company contracted about 1,500 acres of sugar beets which will yield about 20,000 tons. The fixed price without bonus is \$6 per ton but it is believed that \$7 can safely be taken as the ultimate price, giving a total value of \$140,000. A pickle company

contracted 150 acres. This crop returned about \$200 per acre, or a total of \$30,000. It is expected that this industry will be expanded 100 per cent next year.

Strawberry Valley project.—Two organizations contracted for 1,010 acres of peas, at an estimated value of \$86,080; 123 acres of string beans at an estimated value of \$15,540; and 400 acres of tomatoes at an estimated value of \$37,950. Two sugar companies contracted for 7,492 acres of sugar beets at an estimated value of \$775,000. Forty acres of head lettuce were contracted, and a few small scattered acreages by a seed concern.

Okanogan project.—No crops contracted for.

Yakima project.—About 150 acres of squash were contracted, with an estimated value of \$14,400. Two companies contracted for 275 acres of cucumbers for pickles, with an estimated crop value of \$45,000.

Shoshone project.—A seed company sent a representative to the project the latter part of 1924 and early in 1925 and secured contracts for growing seed peas and seed beans, as follows:

Crop	Acreage	Gross returns
Peas.....	550	\$14,000
Beans.....	500	30,000

UNCOMPAHGRE PROJECT PRODUCES FINE CROPS

Recent figures compiled by Prof. W. H. Olin, superintendent of the department of agriculture of the Denver & Rio Grande Western Railroad, call attention to the success of the project this year from an agricultural standpoint. More than 25,000 acres of alfalfa produced more than 100,000 tons of hay, worth in excess of \$1,000,000. Irish potatoes were grown on 15,000 acres and produced 3,000,000 bushels, worth to the farmer more than \$3,000,000.

The third most important crop on the irrigated lands of the project is wheat, of which there are 10,000 acres with an average yield of 40 bushels per acre, making 400,000 bushels worth \$500,000 to the farmer. The fourth most important crop is sugar beets, of which there are 6,500 acres, with a production worth to the farmer about the same as the total wheat crop, or possibly over \$500,000. The fruit lands show a return to the owners of \$250 to \$400 per acre.

Including the returns from oats, barley, onions, hogs, cattle, sheep, and poultry, "the total for the year will run well over \$7,000,000, which is about equal to the entire cost of the project."

MANUFACTURING CONCERNS

Yuma project.—One creamery; 1 cotton-seed mill; 12 cotton gins.

Orland project.—Two creameries; an alfalfa meal mill; a canning and preserving plant.

Uncompahgre project.—Three flour milling companies; 2 creameries; 1 sugar company.

Boise project.—One cheese factory; 5 creameries; 1 canning company.

Minidoka project.—Two sugar factories; 4 cheese factories; 1 cheese factory; 2 butter factories; 2 alfalfa meal mills; 3 flour and feed mills; 1 flour, feed, and seed cleaning mill.

Huntley project.—One creamery.

Lower Yellowstone.—Two creameries, making butter, cheese, and ice cream; a sugar factory; an alfalfa meal mill; two flour mills.

North Platte.—Five sugar factories; 2 creameries, a cheese factory; a milling company. There are several receiving stations in the various towns where butterfat is collected and shipped to outside points.

Carlsbad project.—Six cotton gins.

Umatilla project.—One creamery; 1 alfalfa meal mill; 1 apple packing and shipping plant.

Klamath project.—Four creameries; a cheese factory; two flour mills. The total value of all manufactured and raw products handled is estimated at \$700,000.

Belle Fourche project.—One creamery.

Strawberry Valley project.—Two sugar companies; a packing company; a dairy; and a poultry association.

Okanogan project.—Two creameries; a plum evaporator.

Yakima project.—Eleven creameries; 2 canneries; 5 evaporators; 3 alfalfa mills; 7 flour mills; 3 vinegar factories; 13 cold-storage plants; 28 commercial packing and common storage companies, non-cooperative; 35 fruit shippers, packing, and common storage companies in Yakima.

Riverton project.—One creamery.

Shoshone project.—Two alfalfa mills; a sugar company; a creamery. The farmers received \$53,040 for hay ground, \$216,095 for sugar beets, and \$35,229 for cream.

The land irrigated from Federal reclamation works in 1924 produced crops worth nearly \$110,000,000. This is an increase from the previous year of more than \$7,000,000. The value of crops grown in 1925 will be considerably greater than in 1924.

The amount of water that can be best handled will depend upon the kind of irrigation system that is to be used.

SUGAR BEETS AFFORD OPPORTUNITY FOR PROFITS

Much remains to be done to increase the per acre tonnage from the present relatively low point to that of other irrigated areas where the farmers keep dairy cattle or sheep and follow an approved crop rotation

By George C. Kreutzer, Director of Reclamation Economics

SUGAR beets are grown on 12 of the more northern reclamation projects. In 1915, 20,848 acres were grown with an average yield of 11 tons an acre. In 1922 the acreage was 29,654 and the average yield 11.7 tons an acre. In 1924 the acreage increased to 67,123, but the yield dropped to an average of 8.6 tons an acre. It is believed the lower yield in 1924 was caused by the dry season and in some cases a shortage of water.

The accompanying table shows the comparative areas on Federal reclamation projects, yields, and other information relating to this crop during the years 1915 to 1924, inclusive.

The agriculture of these more northern projects largely centers around alfalfa, with small grains, sugar beets, and potatoes as other major crops and lesser acreages of onions, beans, fruits, and vegetables. Because of the character of the leading crops, livestock plays an important part in the marketing of them. Alfalfa is the chief forage grown on these projects and the best results are obtained when it is fed to livestock. Small grains and corn, where they can be successfully grown, are valuable adjuncts to alfalfa for fattening purposes. To these feeds,

Sugar beets on Bureau of Reclamation projects, 1915-1924

Year	Acreage cropped		Yield (tons)		Value		
	Total	Per cent of total cropped acreage	Total	Average per acre	Total	Average per acre	Per cent of total crop value
1915.....	20,848	2.7	225,854	11.0	\$1,236,049	\$59.00	6.8
1916.....	29,328	3.5	306,596	10.5	1,881,449	64.00	5.7
1917.....	32,924	3.4	318,471	9.7	2,275,338	69.00	4.0
1918.....	27,133	2.6	267,130	9.9	2,731,871	101.00	4.1
1919.....	37,964	3.4	357,977	9.4	3,805,379	100.24	4.3
1920.....	47,160	4.1	455,180	9.6	5,486,251	116.33	8.3
1921.....	40,895	3.5	423,442	10.3	2,690,001	66.00	5.4
1922.....	29,654	2.6	346,627	11.7	2,223,628	75.06	4.4
1923.....	54,777	4.7	548,162	10.0	4,274,852	78.04	6.6
1924.....	67,123	5.5	581,672	8.6	4,140,818	61.70	6.2
Average.....	38,781	-----	383,111	9.9	3,074,564	79.28	-----

sugar-beet tops and sugar-beet pulp add a variety of cheap feed of value.

Project farmers are generally most successful when livestock are kept on farms in sufficient numbers to consume the alfalfa, grain, and beet tops grown, supplemented by beet pulp where it can be procured easily and cheaply. This combination forms a balanced agriculture because it gives animal fertilizer for application to the fields, thus maintaining and even increasing yields; maintains a large portion of the farm in alfalfa, which in

itself is a nitrogen gatherer—as well—as being a more or less permanent crop, provided crops, such as grains, follow alfalfa after it is broken up, thus filling the gap between sod lands and an intensively cultivated row crop, and finally adding that row crop in the way of sugar beets as a cash crop of high returns.

Satisfactory yields of sugar beets can be obtained only by clean and intelligent tillage methods. Attention must also be given to the best plan of crop rotation and the application of animal fertilizers to the fields. How important these things are can be gleaned from the results obtained at Belle Fourche last year. A crop rotation was practiced in which the land was in alfalfa from 3 to 4 years, the following year corn, then sugar beets, followed by oats, and finally replanted to alfalfa when the rotation would be repeated. Sheep were used to consume the alfalfa, corn, and beet tops. This provided manure for the fields. The crop harvested amounted to 20 tons of sugar beets an acre. The soil at the beginning of the rotation was not as good as the average of the district, yet the yield of sugar beets was double the average for the district. Nothing was done in this case that could not be done on any irrigated farm in that locality. An 80-acre farm, under such a rotation, would have from 40 to 50 acres always in alfalfa, about 10 acres each of corn and small grain, and 10 acres of sugar beets.

Various analyses have been made which indicate that it takes from 8 to 10 tons of beets an acre to pay the cost of production. These figures, however, allow the farmer wages for the work he performs. A study of the table given indicates that the profits of the reclamation farmers

(Continued on page 181)



A field of sugar beets grown on one of the irrigation projects

TWO FEDERAL SOURCES OF CREDIT FOR THE FARMER

Intermediate credit banks furnish a means for obtaining loans for a longer period than usual commercial short-time loans—The agricultural credit organizations

THE question of adequate credit is of vital importance to the water users on the irrigation projects, especially the ability to obtain loans at a reasonable rate of interest, and for a period longer than that of the usual short-term loans of commercial banks. In the Yearbook of the Department of Agriculture, recently issued, a chapter is devoted to intermediate credit, from which the following is abstracted:

Farmers frequently need loans for longer periods than commercial banks can safely make. For the production and marketing of livestock, for example, they may need loans ranging from one to three years. The gap between short-term loans ordinarily made by banks and the longer time credit needed by farmers in their operations has been bridged in the past by the renewal of short-term bank loans. This policy of renewing short-term bank loans serves perhaps well enough when conditions are normal. When, however, such loans are called during periods of credit stringency, considerable hardship if not severe losses to farmers may result.

These and other influences led to the passage of the agricultural credits act in the spring of 1923. The principal object of this act was to establish a Federal credit system through which farmers could obtain production and marketing credit for periods longer than those ordi-

narily supplied by commercial banks. It was not the intention of Congress that the new system should supplant the commercial banks already serving farmers, but merely supplement these institutions in financing the needs of agriculture.

The act provided for the establishment of 12 intermediate credit banks with districts corresponding to those of the Federal land banks.

The intermediate credit banks do not make direct loans to farmers. Their advances are made either in the form of direct loans to farmer's cooperative marketing associations or in the discount of agricultural and livestock paper for banks, livestock loan companies, and other credit institutions. The direct loans which these banks make to cooperative marketing associations are secured by warehouse receipts or shipping documents on staple agricultural products. The following products have to date been declared eligible for loans: Corn, cotton, wool, tobacco, peanuts, broomcorn, beans, rice, alfalfa and red-top clover seed, hay, nuts, dried prunes, dried raisins, and canned fruits and vegetables. The intermediate credit banks have been able to make direct advances at rates ranging from $4\frac{1}{2}$ to $5\frac{1}{2}$ per cent.

The Federal intermediate credit banks may also discount for local banks, livestock loan companies, and other credit agencies agricultural paper with a maturity of six months to three years.

Provision has also been made for the organization of agricultural credit corporations in regions where established credit institutions do not provide farmers adequate credit accommodations. These agricultural credit corporations may be organized by any group of citizens. They are organized under State law and must have a minimum paid-up capital stock of \$10,000. The law provides that these corporations may rediscount agricultural paper with an intermediate credit bank up to ten times their capital and surplus. In some instances they have been established as subsidiaries of banks in order to relieve bank portfolios of slow agricultural paper. In other sections they have been organized by farmers and local business men for the purpose of providing a more ample supply of production credit. In still other parts they have been set up as subsidiaries of cooperative marketing associations with the purpose of providing production credit for the members of the association. Many of the cooperative marketing as-

sociations have found their activities restricted by the credit arrangements of their members. Crops that are mortgaged to local lenders must frequently be sold when harvested in order to pay maturing notes. To meet this situation a number of state-wide agricultural credit corporations have been organized by the cotton and tobacco cooperatives. Some of these corporations have been formed to supply production credit and others to finance the delivery of mortgaged crops. They should all serve to reduce the dependence of the farmer upon local sources of credit and give him greater freedom to market his crop through the cooperative association.

During the relatively short period of their existence the intermediate credit banks have made substantial advances both in the form of direct loans and in discounts. Up to the present the larger part of their advances have been made in the form of direct loans to cooperative marketing associations.

Through the establishment of the intermediate credit system a new channel has been opened through which intermediate credit for the production and marketing of crops may freely flow into all parts of the country. Loans are made to both owner and tenant farmers on terms and conditions that are liberal. Renewal privileges are freely granted and partial repayments at the option of the borrower are accepted. Through the sale of tax-exempt debentures the intermediate credit system should be able to provide adequate working capital for agriculture at reasonable cost and for suitable periods. The system has been in operation but a short time and it is too early to fairly appraise its work. While there remain many problems in the development and administration of the system, it is already apparent that the intermediate credit banks will admirably supplement the commercial credit institutions in providing for the credit needs of the farmer.

Pigs to be kept for breeding purposes should be fed with the whole object of making them stretch out and develop bone and muscle in place of fat.

After young gilts have been bred they must be fed a ration heavy enough to grow the litter and properly finish their own growth.

SUGAR BEETS

(Continued from page 180)

have been small. One of the ways to increase the profits from this crop is to increase yields. This can best be done by good crop rotations, livestock on farms, better seed, and improved cultural methods.

In the Johnstown area in northern Colorado sugar beets have been grown continuously since 1904, and, while the soils were fertile to begin with, still the average yields have steadily increased from about 11 tons an acre to 15 tons an acre. Some of the most successful growers never expect less than 18 tons an acre. Without exception these farmers keep either dairy cattle or they feed large numbers of sheep, and in addition they have a uniform crop rotation of alfalfa, small grains, and sugar beets.

Much can be accomplished on the projects to increase the yields of sugar beets if the known good practices of older irrigation areas are adopted.

GERBER DAM CONSTRUCTION, KLAMATH PROJECT, OREGON

Begun in 1924 and completed in 1925 at a cost, including the reservoir site, of \$386,000—Provides storage water for Langell Valley lands and controls flood waters of Miller Creek

By A. L. Darr, resident engineer

GERBER DAM, built for the Klamath project, Oregon, was begun early in March, 1924, and completed June 1, 1925. It was constructed by contract, the contractor being W. D. Miller, of Klamath Falls.

The reservoir is located about 46 miles east of Klamath Falls, in the heart of the old cattle country of southern Oregon. It receives its impounded water from Miller Creek, one of the two main tributaries of Lost River. The area that will be submerged at spillway elevation is about 3,800 acres, with a storage capacity of 94,000 acre-feet.

The purpose of the reservoir is two-fold—to provide storage water for lands of Langell Valley lying adjacent to the lower portion of the Creek and to provide means of control of the flood waters of Miller Creek so they will be prevented from overflowing the bed of Tule Lake. These latter lands have been reclaimed

by the unwatering of Tule Lake, which is the outlet for Lost River. The unwatering was made possible by the construction of a storage dam at Clear Lake, and by the construction of a diversion channel through which the average discharge of Lost River can be diverted into Klamath River. With the completion of Gerber Dam the principal portion of the flow of Lost River is under control, and it is not probable that its flood waters in the future will reach the basin of Tule Lake in sufficient quantity to cause material damage.

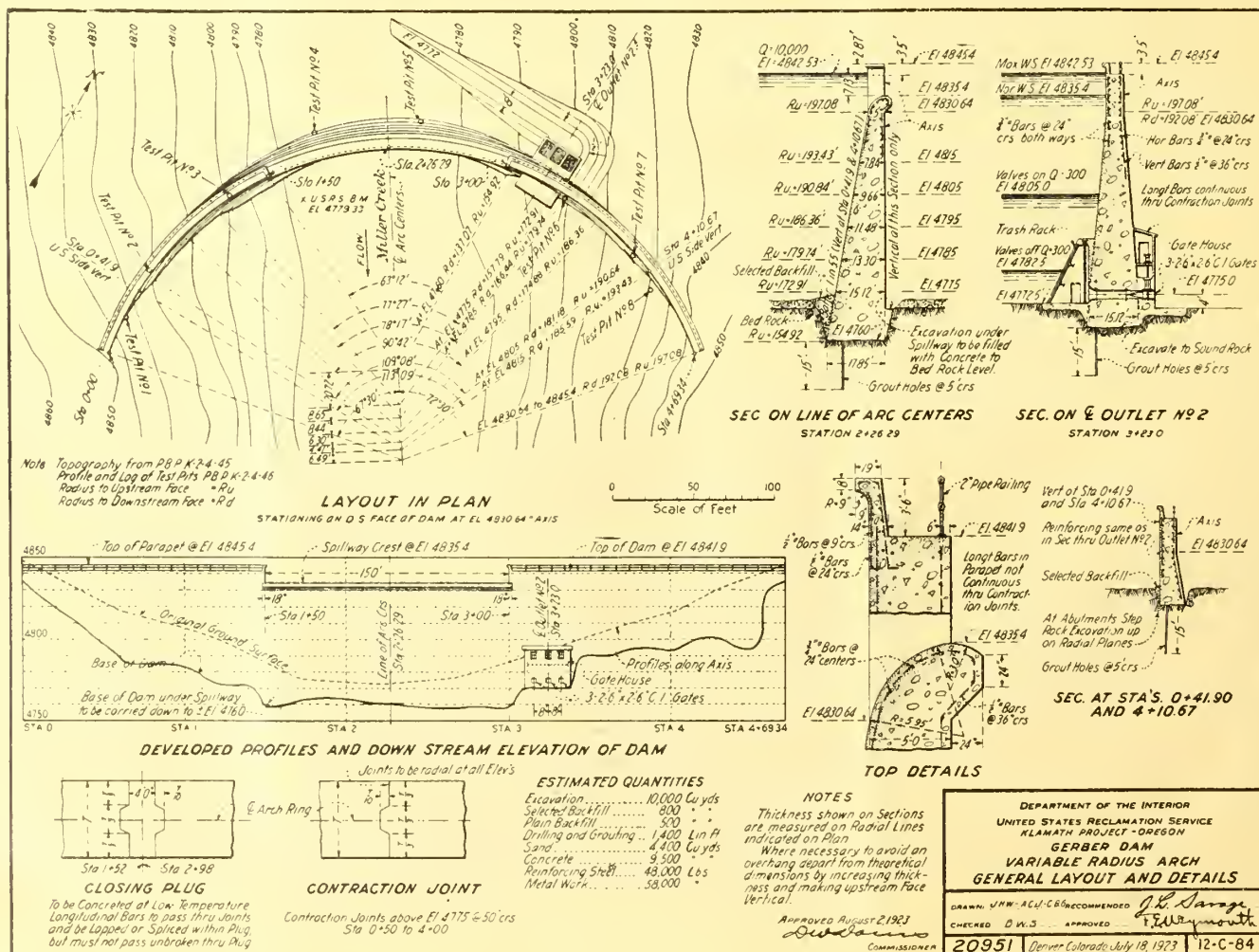
The dam is situated on Miller Creek at the upper end of a canyon, and is about 10 miles above the point where the creek enters Lost River. The walls of the canyon are generally steep and formed of seamy volcanic rock and boulders. The submerged area is largely meadowlands, and includes a large portion of the old Louis Gerber cattle ranch as well

as several smaller holdings. The drainage area contributing to the storage basin covers about 200 square miles, with an average precipitation of approximately 13 inches annually. One-half of the watershed is fairly well covered with timber, the remainder being devoid of any growth except sage brush and scattering junipers.

DESIGN OF THE DAM

The dam is of the variable radius arch type, and is 150 feet in length at channel elevation, and 478 feet long at the top. The spillway crest is 60 feet above the stream bed and is 150 feet in length. The top of the 3½-foot parapet wall is 10 feet above the spillway crest. The capacity of the spillway with a 7-foot depth is 10,000 second-feet.

Excavation for foundations was carried about 18 feet below the stream bed. The portion of the dam constructed in forms



is 15 feet thick at stream bed elevation. The foundation trench across the stream bed averages about 24 feet in width and is filled with concrete. Five feet below the spillway crest the thickness of the dam is 5 feet, which dimension is carried to the base of the parapet wall, 14 inches in width.

Outlet works were installed near one end of the spillway, with trash rack above and operating house below. Conduit pipes are three in number, 36 inches in diameter and 21 feet in length. Cast-iron high-pressure gates, 30 by 30 inches, are installed at the downstream end of the conduits, which are hand operated by geared hoists. Air inlet and water bypass pipes are installed near each gate.

CHARACTER OF FOUNDATION

The character of the dam foundation was carefully investigated before construction. Open test pits were used, and leakage tests were made with water under pressure, to test the water tightness of the foundation rock. Both the leakage tests and the open pits showed satisfactory lava rock for the foundation and abutments of the dam. The rock as then disclosed was not entirely homogeneous, but roughly stratified in layers of hard and soft lava. The lava was broken and seamy but the seams were generally tight and where crevices existed they were compactly filled with stiff clay.

Actual excavation confirmed the conclusions of the preliminary examination in general. However, the layers of hard lava disclosed by the test pits in many cases were found to be made up of loosely conglomerated boulders, often separated by clay-filled seams which disintegrated upon exposure. The soft layers were generally water-tight, but also disintegrated with exposure and yielded quite readily to a pick.

On account of the showing of the open cut it was considered necessary to carry the foundation well into the rock. As an additional precaution against the tendency of the water to cut a channel around the end of the dam in the soft layers, a keyway 2 to 3 feet in depth and of about the same width was cut into each soft layer. This was filled with concrete as the dam was poured. To further prevent the erosion of the soft material under

Cost of Gerber Dam and Reservoir

Excavation, 15,952 cubic yards, at \$3.....	\$47,856.00
Placing concrete, 11,888 cubic yards, at \$11.50.....	136,712.00
Selected backfill, 1,571 cubic yards, at \$1.25.....	1,963.75
Grouting foundation, 1,680 linear feet, at \$3.....	5,040.00
Placing steel reinforcement, 62,933 pounds, at \$0.06.....	3,775.98
Placing metal work, 78,067 pounds, at \$0.05.....	3,903.35
Manufacturing sand, 1,971 cubic yards, at \$6.55.....	12,906.20
Hauling sand, 3,832 cubic yards, at \$5.67.....	21,745.37
Extra work.....	1,366.44
Materials furnished by contractor.....	349.42
Total contract earnings.....	\$235,618.51

MATERIALS SUPPLIED BY UNITED STATES

Cement, 16,068 barrels.....	\$48,896.80
Marysville sand, 603 cubic yards.....	1,614.80
Metal work and reinforcement.....	3,480.53
Outlet gates and conduit, 54,182 pounds.....	10,107.61
Pipe for grouting, 1,080 linear feet.....	662.17
	64,761.91

MISCELLANEOUS EXPENDITURES BY UNITED STATES

Purchase of reservoir site, 1,800 acres.....	\$27,032.30
Royalty.....	500.00
Surveys, test pits, plans, estimates.....	11,691.58
Telephone line.....	2,698.50
Relocating and building 7 miles of county road.....	7,773.60
Drilled well 300 feet deep.....	2,759.62
Estimated cost, cottage, barn, and outbuildings for gatekeeper.....	6,000.00
Camp maintenance.....	1,136.02
Engineering and inspection.....	10,071.06
Superintendence and accounts.....	3,540.20
General expense.....	12,423.27
	85,626.15

Total cost of storage works and reservoir site.....	386,006.57
---	------------

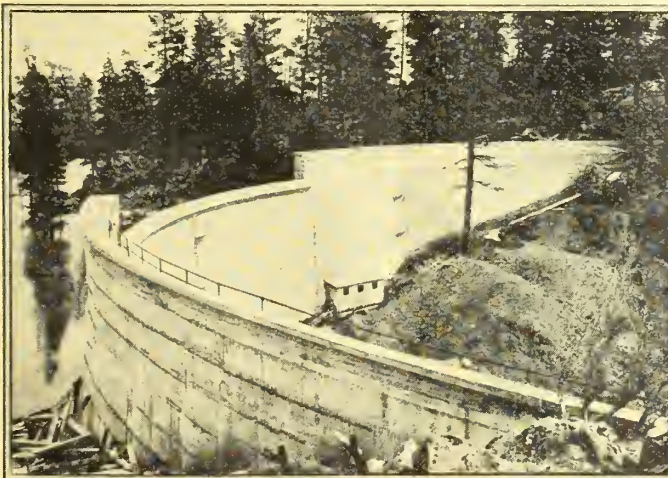
velocities due to reservoir heads, and to transfer a part of the thrust resulting from arch action to the walls of the excavation, forms were omitted and concrete poured against the walls wherever solid rock was encountered.

Although the rock, as before stated, was considered water-tight and proved so by test, the foundation was grouted as an additional precaution. Grout holes were drilled 5 feet apart throughout the length of the dam 2 inches in diameter and 15 feet in depth. Pipe 3 inches in diameter and 8 feet long were set in these holes, and after concrete had been poured to a depth of about 6 feet in the dam the holes were grouted under 100 pounds steam pressure. Other grout holes were drilled wherever a seam occurred in the foundation. In some cases three parallel rows of holes were used where the foundation seemed especially open; 200 sacks of cement were used to fill the 112 grout holes drilled. As many as 17 sacks were used in a single hole, 4 holes in one section of the foundation requiring 42 sacks. The amount used ordinarily was 1 to 1½ sacks to the hole. Where the foundation appeared noticeably poor, extreme precaution was taken in the way of omitting forms and filling the excavation section with concrete, for the purpose of securing arch action over the weak spots, and securing a better bond with the side walls of the cut.

POURING THE CONCRETE

The total amount of concrete placed in the dam was 11,888 cubic yards, utilizing 15,900 barrels of cement. About 125 barrels were used in grouting and for bond between pourings. The quantity of cement per cubic yard of concrete ranged from 1.28 to 1.50 barrels, according to the mix. The total amount of reinforcing steel required was 62,933 pounds, and metal work totaled 78,067 pounds.

(Continued on page 184)



Gerber dam, Klamath project, Oregon-California

GERBER DAM CONSTRUCTION

(Continued from page 183)

Plum rocks were placed in the concrete where forms were not used and to provide a bond in joints between pourings.

Pouring was begun August 12, 1924, and by December 16, when pouring was discontinued on account of cold weather, 11,864 cubic yards had been placed. The remaining 24 cubic yards were placed in May, 1925. The amounts poured each month were as follows:

	Cubic yards.
August, 1924.....	1,900
September, 1924.....	4,730
October, 1924.....	3,362
November, 1924.....	1,589
December, 1924.....	283
May, 1925.....	24

Weather conditions were generally favorable for concrete work, special measures for protection being required during the cold weather of December. Materials were heated and concrete kept warm in the forms, so that no concrete in place was damaged by frost.

Forms used consisted of 4 by 8 feet wooden panels, faced with 20-gauge sheet iron. Two sets were used, the lower being lifted above and set on the plate of the upper as the work progressed. Pouring was thus conducted in 4-foot lifts. The forms were anchored by No. 8 gauge wires, doubled, to rows of wire anchors made of No. 6 gauge wire and 18 inches long. About 10,000 pounds of wire were thus used and left in the dam. Spreaders 2 by 12 inches were used on top of the 4-foot forms, cut to exact width at the level on which they appeared. These spreaders served as a guaranty that the forms would remain in place and that the required thickness of the dam would be secured. They served to reduce both the engineering and form work required, and acted as

joists for flooring when such was needed in the work. Channels 10 inches wide and 6 inches deep were left in each pouring joint to prevent leakage.

Hard, clean, igneous rock was secured adjacent to the dam site in sufficient quantities to furnish the required supply for concrete. Sand used consisted of various blends of local sand from three pits, basalt sand manufactured at the crusher plant, and sand shipped from Marysville, Calif. The haul from pit No. 1 was about 4 miles; that from pits 2 and 3 averaged about 17 miles. The length of truck haul for Marysville sand from the railroad siding to the dam site was about 27 miles. Various mixes were used, according to the blend, ranging from a 1:2:4 to a 1:2¼:4½ mix. About 55 per cent of the sand used was local sand, 11 per cent Marysville, and 34 per cent manufactured basalt sand.

Slump tests were taken at regular intervals during the progress of the work. It was the intention to produce concrete of a consistency corresponding to a slump of 3 inches in the main body of the dam, a slump of from 6 to 8 inches being permitted in thin reinforced walls.

Cement and sand briquettes, and cylinders of concrete taken from the forms were also made regularly, to check tensile strength of the cement and for compression observations.

Contraction joints were maintained at intervals of 50 feet, with two closing segments 4 feet in width which were poured at low temperatures.

EXPERIMENTAL APPARATUS

Apparatus was installed for the purpose of enabling a series of observations

leading to the underlying laws of the distribution of stresses in the dam. These stresses result from temperature changes, deformation from various causes, and deflection due to load. Seventeen thermometers were placed at three levels in the dam, at the center, distributed from face to face of the structure. These thermometers are electrically connected with a switchboard in the gatehouse. Nine deformation stations were placed on the downstream face of the dam and two on top. Those on the face provide eight measuring spans, and those on the top one each. Measurements will be taken at various water levels in the reservoir, and seasonal. For measuring deflection, four targets were set at different levels on the downstream face of the dam on the line of arc centers. Land targets were placed at one end of the dam, and a sliding transit base at the other. Lines of sight observed from a transit on the sliding base, through the targets on the dam, to the land targets, and compared for various reservoir levels, will provide means of determining presence of movement of the dam.

PLANT EQUIPMENT

The crushing plant, storage bins, and mixing plant were located on the hillside above and near one end of the dam. The capacity of the crushing plant operating 16 hours was about 140 yards of rock, 25 yards of which was made into basalt sand. About 7,000 cubic yards were poured by gravity by means of chutes and pipes. The remainder was carried by chute to a hopper in the stream bed and reelevated by steam hoist to a high line. The concrete was carried on the high line in a bucket supported by a traveler. The bucket dumped directly into forms or chutes.

Three and one-half per cent of the sand listed was used in grout for priming new pourings and as waste in rejected and spilled concrete around the bins and plant.

About 17,000 acre-feet of the spring run-off was stored. The maximum water surface behind the dam reached an elevation of about 35 feet above the level of the creek bed and about 25 feet below the spillway crest. At first there was a little leakage through the concrete in a few places, all of which practically ceased in a few weeks. There was no visible leakage under the dam or around the ends. No springs developed in the canyon below the dam, and the reservoir bottom appears to be tight, the data thus far obtained indicating that substantially all losses can be accounted for by evaporation.



An inclined drop on the Umatilla project, Oregon

CUCUMBERS PAY C. M. BAGLEY

Sunnyside division, Yakima project, Washington



Mr. Bagley's cucumber field

THE problem of a cash crop, one of the farmer's greatest needs, is being solved so successfully on the Sunnyside Division of the Yakima project by C. M. Bagley and his family that the two older sons were able to enter college this fall, largely as the result of their summer's work.

Two years ago Libby, McNeill & Libby began contracting acreages of cucumbers for pickling, the policy of the company being to furnish seed and contract for very small acreages, such as the farmer and his immediate family can care for properly.

Mr. Bagley contracted for 2 acres in 1924 and $1\frac{5}{8}$ acres in 1925.

The soil was rich sandy loam, and a portion was fertilized with barnyard manure at the rate of a little more than 20 tons to the acre, the best results being obtained, however, from land on which alfalfa had been turned under.

The first year the crop was planted in rows 6 feet apart, in hills from 3 to 4 feet apart. Because of the trouble experienced with wire worms, the seed was drilled in the second year, but the former practice was found to be more successful.

The ground was thoroughly prepared by cultivation before planting and was cultivated after each irrigation (Mr. Bagley stresses the importance of cultivation), being hand cultivated twice. The field was ditched out for irrigation with a furrow on each side of the row, as close to the row as possible, and during the heavy growing season it was necessary to irrigate the crop about once a week, the amount of irrigation being that required to maintain an even moisture in the soil.

The 1925 crop was planted on May 15 and picking began on July 8, being continued every other day for 60 days, until the children started to school.

In 1924 21 tons of cucumbers were marketed, realizing \$856 from the 2 acres, and, in 1925, 26 tons were picked, realizing \$908 from the $1\frac{5}{8}$ acres. The 1925 growing season was long and hot, which tended to increase the size of the cucumbers while decreasing their value. The largest day's picking, on August 10, amounted to 2,515 pounds. Seventy-five dollars was spent for outside help in 1924 and \$30 in 1925.

The contract prices were \$75 per ton for cucumbers 1 to 3 inches long, \$40 per ton, 3 to 4 inches, and \$15 per ton, 4 to 5 inches, with an optional price of \$10 for nubs and crooks. For the year 1925 the company shipped from its temporary station at Sunnyside, Wash., to its pickling works at Auburn, Wash., 41 cars, or about 8,000 barrels of approximately 400 pounds each.

Mr. Bagley, who is also engaged in dairying and general farming, considers his cucumbers only as an incidental, but believes that the crop assists more than any other he has found in giving profitable and fairly easy employment to his children, of whom he has several of school age. Probably the most secure and satisfactory agriculture being practiced on the Yakima project is that characterized by a diversification which includes the growing of some one or two cash crops.

MILK RIVER PROJECT SUGAR FACTORY

AN event of far-reaching importance to the Milk River project, Montana, was the opening in the latter part of October of the new \$1,000,000 sugar factory at Chinook. The factory stands on a site just east of the city and covers 40 acres. The building proper is of brick and steel construction and is 70 feet wide and 400 feet long. It stands three stories high. There are enormous storage warehouses, 250 by 400 feet in size, for 20,000 tons of beets. The factory capacity is 120 tons of beets daily, with an output of 4,000 bags of sugar a day. Five thousand five hundred acres of sugar beets were planted in the Milk River Valley this summer. Yields reported range from 10 to 22 tons an acre.

At the opening ceremonies the opinion was expressed that the valley is capable of producing enough beets for several factories. Bishop C. W. Nibley stated that an irrigated farm of 20 acres is large enough for any family, and that an acreage of this size, intelligently farmed, will return a good living. He pointed out that dairying goes hand in hand with the establishment of the

sugar-beet industry, and asserted that what is needed more than anything else on the project is a lot of hard-working people.

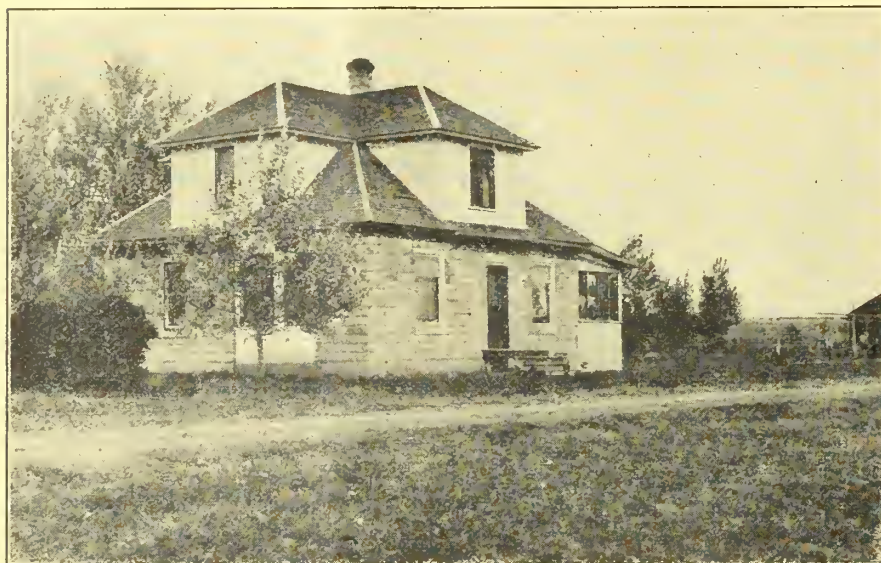
Governor Erickson declared that Montana's future agricultural success depends more on the successful development of its irrigation possibilities than upon dry farming, and added that irrigation was needed for sugar beets, dairying, and intensive farming.

W. H. Wattis, general manager of the sugar company made a plea for more people in the Milk River Valley. "Your sample population is fine," he said. "Now let us see more of the same kind. You have everything here that should attract the right sort of farmers—comparatively cheap land, wonderful climate, and productive soil. It should be easy to get new settlers. You have learned during the last summer that it takes labor to raise sugar beets. You can't expect a stable supply of labor unless you have a large population."

The sugar-beet crop this year on the project is of exceptionally high quality and should bring excellent cash returns to the growers.

AUGUST MAASS, SUCCESSFUL FARMER

Belle Fourche project, South Dakota



Farm home of August Maass, Belle Fourche project, S. Dak.

in recent years has been selling at \$6 to \$8 in the stack. The same is true of corn and small grain which are unprofitable irrigated crops unless shipped on the hoof. Three tons of alfalfa at the prevailing price mean a gross return of \$21 per acre, but six fat lambs per irrigated acre is another story.

Sheep raising is perfectly adapted to irrigation farming on the Belle Fourche project. The lambing season requires intensive application, but is generally over before the land is ready for spring work. From May to October the ewes and lambs are on the open range in care of a herder and the farmer's time can be given to the usual activities which are plentiful during the growing season. Fifteen cents per head per month for ewes is the usual price for summering the flock and the herder has a hundred miles of open country available for pasture.

In order to get good results, even with the contour flooding system, it is necessary to do considerable smoothing or leveling of the land.

THE sheep industry has been a bright spot in irrigation farming during the lean years of the postwar period and has spelled success for those water users on the Belle Fourche project, South Dakota, who took up sheep farming as their principal line. The result obtained by August Maass is an example of profits to be derived from specialized livestock production that includes feeding of all grain and bulky crops on the farm.

Mr. Maass owns a 160-acre farm with 103 acres of irrigable land. This is given to the production of ordinary feed crops, including alfalfa, corn, and small grain. In 1919 he purchased 150 ewes at top prices, and under the drastic deflation which followed his profits at first were on the wrong side of the ledger. Thrift and industry surmounted all obstacles. The sheep market was the first to be reestablished and with it his flock increased to proportions that balanced his farming operations. Mr. Maass winters about 450 ewes and during the past several years had a record lamb crop of 130 to 140 per cent. This means that he markets each year about 600 fat lambs with a gross return of \$13 to \$15 per head. But this is not all. Last year he sold 4,500 pounds of wool at 46½ cents per pound, so that the total income from his band of ewes runs into five figures.

No attempt is made here to go into the intricacy of net returns and labor income. There are expenses of course, but Mr. Maass agrees that sheep farming doubles the market value of his alfalfa hay which

THE SETTLEMENT CONFERENCE

THE sessions of this conference will be held in the auditorium of the Interior Department Building, December 14 and 15. The purpose of it is to devise means for making rural life more attractive and to broaden the opportunities for settlement and farm development by people of small or moderate means and to consider Federal reclamation as applied to swamp and cut-over lands authorized by the last Congress.

Some of the conditions prompting the calling of this conference are unoccupied farms on reclamation projects, which number about 6,000; about 500,000 acres are unirrigated, uncultivated, and largely unsettled. The settlement of these lands will not only contribute to the economic and social value of the reclamation policy but will improve the financial condition of Federal projects, spreading the expense over a greater number of people and lessening the individual burden, thus creating contented farm communities.

The Secretary of the Interior will open the meeting, and immediately following his address of welcome there will be an address by the Secretary of Agriculture. The chairman of the Subcommittee on Appropriations for the Interior Department, Hon. Louis C. Cramton, Col. John H. Carroll, Dr. John A. Widsoc, Hon. Thomas E. Campbell, and representatives of the western and southern railroads and of the colleges of agriculture and universities of these sections will speak or take part in a general discussion of our problems from their standpoint. In an evening session, Doctor Mead will give an illustrated talk on aided and directed settlement, as will also our director of reclamation economics, George C. Kreutzer. The session on December 15 will be opened by an address by Hon. E. C. Finney, First Assistant Secretary of the Interior. There will also be addresses by Senators, Congressmen, representatives from chambers of commerce, and others, all built around the theme of land settlement and farm development.

In a later number of the NEW RECLAMATION ERA we will print the complete program of the conference as finally decided on.

A beautiful thought will be carried to the conferees by the exhibit of a wall chart with the following wording:

"It is from the tillers of the soil that spring the best citizens, the staunchest soldiers; and theirs are the enduring rewards which are most grateful and least envied. Such as devote themselves to that pursuit are least of all men given to evil counsels."—(CATO, about 50 years before Christ.)

THE COLORADO TON-LITTER CONTEST

By H. A. Ireland, associate agriculturist, Montrose, Colo.

THE ton-litter contest for 1925 closed in Colorado on November 1. The purpose of this contest was to determine the greatest weight of pork possible to produce from one litter in 180 days and the cost of such production; also to encourage the use of better stock, saving the pigs at farrowing time, and the feeding of properly balanced rations made up as largely as possible from home-grown feeds.

In the two counties of Montrose and Delta, which comprise the Uncompahgre project, there were more than 20 entries in the contest this year, but only a few were able to finish. Several litters were entered before they were farrowed and proved to be too small to make it worth while for the owners to try for the minimum weight of 2,000 pounds in 180 days. Other litters suffered the loss of some of the pigs, others were not the right kind of stock to make the required growth, and

in other cases the feed ran out before the pigs were finished.

This proved to be a bad year in some respects for such a contest, for the price of all feeds has been exorbitant, and for some reason it seemed to be necessary for most of the contestants to buy feed. Money was hard to get and the feed wasn't bought; hence some of the litters that would very easily have qualified were not given a chance to show what they could do. In a way the fact that feed was high has proved an advantage, for it so happened that the three litters that completed were all finished on feeds that were purchased in small amounts on the retail market and in spite of this handicap all three showed a fair margin of profit over feed cost. It is interesting to note the similarity of gains and costs in the three cases, as shown in the accompanying figures:

W. R. HARKNESS, MONTROSE

11 pigs raised, Duroc-Jersey breed; final weight at 180 days, 2,228 pounds:	
Feed—	
1,700 pounds bran.....	\$32.45
3,700 pounds corn.....	107.45
175 pounds tankage.....	7.80
720 gallons skim milk.....	21.60
¼ acre pasture.....	2.50
Total.....	171.80
Hogs sold at 11½ cents per pound brought.....	256.22
Less feed cost.....	171.80
Profit.....	84.41
Feed cost per hundredweight gain.....	7.72

MRS. A. F. HUSER, MONTROSE

11 pigs raised, Duroc-Jersey breed; final weight at 180 days computed; actual weight at 168 days, 2,586 pounds:	
Feed—	
1,500 pounds oats.....	\$26.35
1,500 pounds bran.....	28.50
350 pounds tankage.....	17.50
900 pounds barley.....	21.60
600 pounds shorts.....	14.40
1,500 pounds corn.....	43.20
700 pounds wheat.....	17.50
472 gallons buttermilk.....	11.80
760 pounds mixed feed.....	18.90
¼ acre pasture alfalfa.....	2.50
¼ acre green corn.....	8.00
Total.....	210.25
Hogs sold at 11½ cents pound, 2,556 pounds.....	293.94
Less feed cost.....	210.25
Profit.....	83.69
Feed cost per hundredweight gain.....	8.22

N. D. SIMPSON, CEDARENGE

10 pigs raised, Duroc-Jersey breed, final weight at 180 days computed; actual weight at 185 days, 2,553 pounds:	
Feed—	
2,300 pounds shorts.....	\$48.70
5,200 pounds corn.....	144.60
100 pounds tankage.....	4.50
150 gallons skim milk.....	4.50
Total.....	202.30
Hogs sold at 11½ cents pound, 2,463 pounds.....	283.24
Less feed cost.....	202.30
Profit.....	80.94
Feed cost per hundredweight gain.....	8.21

The ton-litter contest has been promoted by the State Agricultural College, the Denver Chamber of Commerce, local chamber of commerce, and the Denver & Rio Grande Western Railroad. Fifty dollars was contributed by the Denver Chamber of Commerce to any county that would put up an equal amount, the \$100 being divided in four prizes in the proportion of \$50, \$25, \$15, and \$10. In addition, packing companies have given special prizes of cash or feeds.

Locally interest in the contest seems to warrant its repetition and it is hoped that the cooperating parties will continue their interest in the project.

WATER CONSERVATION AND CONTROL MEETING

Water conservation and control is the general subject of a conference at Seattle on December 8 of representatives of the 11 Western States, held under the auspices of the western division of the Chamber of Commerce of the United States.

As stated in the preliminary program, "while the water conservation and control program as outlined is primarily of an informative or educational nature, some common grounds for recommendation are sure to develop. These may deal with national or State policies, or merely with desirable local attitude or action in water conservation matters. The essential purpose is to interest and inform business in the more important matters of water conservation and control."

The program includes the following addresses:

Federal and State cooperation in the financing and settlement of western irrigation and reclamation projects, by J. L. Lytel, superintendent of the Yakima project, Washington.

How rapidly are the various States justified in pressing at this time programs of water conservation and control, and in what way should the State and National Governments assist? by Dr. John A. Widtsoe, member of the board of survey and adjustments, Bureau of Reclamation.

Financing irrigation projects through district bond issues, by W. R. Williams, formerly superintendent of banks and member of the Irrigation District Bond Commission of California.

Salt should be kept before sheep at all times. They will overeat it if supplied only at intervals.

COLUMBIA RIVER

WATER ALLOCATION

A meeting of the Columbia River Water Allocation Commission was held at Spokane, Wash., on October 31, at which the following members were present:

Col. W. J. Barden, United States Engineer Corps, Federal Power Commission.

Maj. R. T. Coiner, War Department.

R. K. Tiffany, supervisor of hydraulics, State of Washington.

J. L. Lytel, superintendent of the Yakima project.

Glenn Parker, United States Geological Survey.

C. S. Heidel, State engineer of Montana, and Warren G. Swendson, commissioner of the Department of Reclamation, Idaho, members of the commission, were not present.

The matter of studying the available information relative to the waters of the Columbia River was discussed, and it was thought that the several reports that have been made on the Columbia Basin project and the water supply for it should be obtained and their contents studied.

In view of the absence of representatives from Montana and Idaho, no definite action was taken and the meeting was adjourned to meet at Seattle in December.

SETTLEMENT AND CREDIT

RECENTLY a questionnaire was sent to a number of organizations interested in the establishment of a definite policy of settlement and credit on the irrigation projects.

Many of the replies stressed the thought that coupled with any workable settlement plan should be the provision of adequate credit for the prospective settler, based on long-time loans at reasonable rates of interest. Equally important is a policy under which settlers receiving such credit would recognize definitely that these obligations must be lived up to, and that otherwise the success of future reclamation would be impaired. This thought is forcefully expressed in the following comment from a representative of one of the Western agricultural colleges:

If a workable plan concerning credit with low interest is established, together with a long-time payment of the principle, it will stimulate settlement of farmers on these lands. I think, however, that the Reclamation Service has made a mistake by putting off from time to time payments that were originally to be required of the settlers. It is my opinion that in many cases these payments could have been made, but that many farmers obtaining land from the Reclamation Service and farming it for awhile have gotten the idea pretty firmly fixed in their heads

that it was not necessary to meet their obligations to the Government. The action of the service in the past would indicate that their surmise is correct. I think that the principal thing needed at this time is to formulate a workable plan; provide opportunities for a worthy farmer to finance himself during the development period; make the payments such that he can meet them; and then see to it that he fulfills his part of the obligation, or take the farm away from him and put some one else upon it.

The wishy-washy policy that has been followed will ruin any plan proposed, but as soon as these men find out that the Government means business, and that if the individual does not meet his obliga-

tions to the Government he forfeits his farm, you will find that the payments will be made.

The answers to the questionnaire also bring out clearly that selection of settlers on the basis of known qualifications is essential to the success of reclamation development.

Another suggestion meriting consideration is that enough land should be seeded to alfalfa and made ready for other crops, prior to settlement, to enable a settler at least to pay expenses the first year from his farming operations. Clearing, leveling, and running ditches can be done more economically in large units and could be included in the construction charge and repaid as a part of it; or the sums thus advanced could be secured by notes and mortgages and repaid as an interest-bearing obligation over a period of years suited to the character of the advance.

Unoccupied farms on the projects should be put into attractive shape. Buildings should be repaired and painted, fences straightened up, and fence corners cleaned out. As one correspondent expresses it, "One dilapidated farm will do more to injure a sale and discourage new settlers than anything else."

Judging from the replies to this questionnaire, the time has come when States, financial institutions, railroads, and business interests generally must get together and solve the problem of farm-land development, of which financing the settler is the outstanding question.

BELLE FOURCHE SHOWS WHAT CAN BE DONE

Bert Jenks, one of the prosperous farmers living 4 miles east of Nisland, states that his 12-acre field of corn averaged 85 bushels per acre.

With cucumbers bringing in from \$400 to \$500 per acre, sugar beets averaging around 20 tons per acre, and corn yielding from 60 to 85 bushels per acre, it is evident that the Belle Fourche project has possibilities.



More than 37 per cent of the cropped area on the projects was devoted to alfalfa in 1924

IS COLORADO RIVER SILT A NATURAL FERTILIZER?

EXPERIENCE is demonstrating both on the Yuma project and in the Imperial Valley that the long and lauded claims of the wonderful fertilizing properties of the silts of the Colorado River have been much overdone. A great many now believe the silts are an actual detriment to the lands instead of a benefit. With the real sandy lands, the first application of the silts tends to improve the physical qualities of the soil, but with further application the tendency is to make a hard soil that is very difficult to cultivate. Where the sandy contents are removed, such as is done with the desilting at Laguna dam, and under the natural process of desilting carried on through the irrigation systems, the clay materials are carried out upon the soil. This in time builds up a layer of very rough clay material. Recently a run of water showed a very high silt content, reaching a maximum at Yuma of 3.75 per cent. Many of the farmers refuse to irrigate with the water carrying such high quantities of silt. Those who did irrigate obtained a layer of silt, in some places as much as one-quarter of an inch in thickness. This silt, when containing moisture has much the constituency of rubber, thus excluding the air from the soil. Upon becoming dry it cracks and rolls. Finally this becomes mixed with the soil in the cultivated fields and part

of its detrimental effects are overcome for the time being, but with many applications of this variety of silt the soil becomes compact and hard. In the uncultivated fields like alfalfa a blanket gradually forms which is compact and hard and excludes the air to a greater or less extent.

BOARDS APPOINTED TO SELECT SETTLERS

Additional boards for the selection of settlers under the provisions of subsection C of section 4 of the act of December 5, 1924, have been appointed by the Secretary of the Interior, as follows:

Shoshone project.—Frannie Division: C. M. Davis, Deaver, Wyo.; H. S. Looper, Lovell, Wyo.; and L. H. Mitchell, Powell, Wyo. Willwood and Garland Divisions: C. M. Cox, Cody, Wyo.; F. A. Mills, Powell, Wyo.; and L. H. Mitchell, Powell, Wyo.

Newlands project.—I. H. Kent, Fallon, Nev.; J. F. Richardson, Fallon, Nev.; and C. G. Swingle, Hazen, Nev.

Membership of the boards for the Grand Valley, Uncompahgre, and Klamath projects was given in the November issue of the NEW RECLAMATION ERA.

The fertilizing qualities in the silt itself are those which are naturally in the Yuma project soils and are of little or no value. The main elements that these desert soils lack are nitrogen and phosphoric acid. The former is leached out of all of the silty material and the latter, if present, is not in a form that is available to plant life. Of course, there is some variation in the desirability or undesirability of the silts, depending upon the area from which the particular flood may have originated which brings the silt into the Colorado River.

A striking example of the detrimental effect of these silts was noticed recently on the project. One of the farmers west of Yuma irrigated his alfalfa with the muddy water and an adjoining neighbor refused to put this water upon his alfalfa. On October 4 and 5 there was a rainfall of 1.60 inches in the Yuma Valley. The alfalfa that was irrigated with the muddy water turned yellow and sickly looking, whereas across the road on the tract that was not irrigated, the alfalfa put on a wonderfully new green growth and outstripped the field that was irrigated. The irrigated field had quite a coating of silt left upon it. In the last few years these examples have been common.

The wonderful fertilizing qualities of the silts of the Colorado River have been advocated for so long that the majority of the people take it for an accepted fact without studying the matter themselves, but it will be found among the more progressive farmers and those who have taken an interest in agricultural development that they are coming to the above conclusion.



Many of the projects winter thousands of head of sheep

SOUTH PLATTE RIVER COMPACT

THE compact providing for the equitable division and distribution of the waters of the South Platte River between the States of Colorado and Nebraska, signed at Lincoln, Nebr., April 17, 1923, by the commissioners of the respective States and recently ratified by the legislatures of those States, marks the consummation of the first effort to adjust by treaty an interstate river controversy between two or more States of the arid region.

This points the way to a happy solution of a very difficult problem with which many States have been and are confronted and heralds the approach of the day when prolonged and expensive litigation will be supplanted by this more expeditious and effective method of composing disputes relating to the division of waters flowing in the interstate streams. It is safe to predict that other States will emulate the worthy example thus set.

The compact, which it is declared shall include and be binding upon the citizens, corporations, and others in each signatory State engaged or interested in the diversion and use of the waters of the South Platte River, divides the stream system into two geographical divisions designated as the upper section and lower section, and provides for the joint maintenance of an interstate gauging station to be located near Julesburg, Colo., for the purpose of ascertaining and recording the quantity of water flowing from Colorado into Nebraska as an aid to the administration of the compact.

The water is to be divided between the two States in accordance with schedules stated showing the amounts, places, means of diversion, and seasons of use by the respective States and their citizens, due regard being had to perfected rights and priorities established by court adjudications.

Nebraska grants to Colorado the right to acquire by purchase, prescription, or condemnation, rights of way necessary for the construction, maintenance, operation, and protection of irrigation works in that State necessary for the diversion, carriage, and utilization of water in Colorado. Colorado extends to Nebraska a similar privilege.

The compact specifies that it is designed to meet physical and other conditions peculiar to the South Platte River and disclaims any intention by the compact to establish any general principle or precedent with respect to other interstate streams.

It is provided that the contract may be modified or terminated at any time by mutual consent of the signatory States, with a provision that if so terminated and Nebraska or its citizens shall seek to enforce any claims founded on vested rights, the statute of limitations shall not run in favor of Colorado or its citizens with reference to certain claims enumerated.

The compact, it is provided, shall become operative only when approved by the legislature of the two signatory States and by the Congress of the United States.

COLONIZATION IN ARGENTINA

IN an article entitled "The South American melting pot," in a recent issue of the Saturday Evening Post, Isaac F. Marcossion refers to the efforts of Argentina to induce immigration and colonization on a large scale. The ideal back of the colonization laws was expressed as follows by President De Alvear:

Immigration will not yield its utmost benefit in connection with the real activities of the country, nor will it improve our production, if the difficulties which at present hinder and obstruct colonization are not removed. We must give definite and permanent access to the soil to the rural worker. For the worker, whether he be tenant or partner, the feeling of actual ownership of the ground he works is the great stimulus to effort. We need more small farms. We need more small farmers. The only way to get them is to assist them to own their own land.

The greatest obstacle referred to by President De Alvear is the fact that control of the bulk of the land is in the hands of old and influential Argentine families, who have steadily opposed colonization schemes involving the small farmer.

Under the new plan, however, the law provides "for the expropriation of 50 per cent of the larger estates if the pro-

prietor himself has not already colonized one-half of his holdings or does not immediately take steps to do so. The Government is authorized to sell the expropriated land in small parcels on easy terms, and to establish or to promote credit, insurance, and cooperative institutions for the encouragement of agriculture."

The Jewish colonies in Argentina, under the direction and sponsorship of the Jewish Colonization Association, are a tribute to the philanthropic work of the late Baron de Hirsch. Colonists are obtained by the association through agencies in Moscow, Warsaw, Bucharest, Budapest, and other points. The total land ownership of the 15 established colonies now amounts to 1,355,600 acres, with 375,000 acres in reserve for future operations.

The land is sold to the colonist at cost, and the settler is advanced \$3,000 for the purchase of a house, farm implements, and the necessary farm animals. Repayment on the land and the loan is in 20 annual installments at 5 per cent interest. The property can not be sold until the debt is paid off, at which time the colonist receives title to his holding. In one colony the value of the land has increased from \$8 an acre to \$160. Each

colony has adequate schools, churches, a cooperative society, and a bank. The principal crops are wheat, linseed, oats, barley, corn, and peanuts.

Despite the evident success of these Jewish colonies and the possibilities for colonization on a large scale through the new colonization laws, it is pointed out that more recent efforts of North American colonists to obtain a foothold in South America have usually ended in disaster. Among these have been many western farmers who have been attracted by glittering prospectuses to sell out and try their luck in South America.

The usual reasons why these undertakings fail are that they are situated at too great a distance from marketing centers or railroads leading to marketing centers, unfavorable climate, doubtful title to the land, unfriendly native sentiment toward foreign agricultural settlers, and ignorance of the language and customs of the country.

Superintendent Newell and H. K. Smith, hydrographer, Klamath project, made a trip recently through the upper reaches of Willow Creek, the main feeder of Clear Lake. The object of the trip was to inspect the reservoirs which have been constructed on the watershed by the ranchers. From the evidence obtained it does not appear that the water supply of the project will be affected appreciably by such works as have been built thus far.

ORGANIZATION ACTIVITIES AND PROJECT VISITORS

GLENN C. WRIGHT, senior engineering draftsman in the Denver office was transferred to American Falls on October 24.

Ignacio L. Figueroa, adviser in the Lands and Irrigation Department of the Mexican Government, is making an inspection study of several of the irrigation projects, with special reference to settlement and economic problems.

Congressman Clarence F. Lea visited the Orland project during the month and directed special inquiries toward the proposed Stony Gorge Reservoir and general project conditions during the year.

The Senate Irrigation Committee arrived on the Yuma project late in October. Superintendent Preston, Fred Blohm, and W. E. Johnson, a committee of the Yuma County Water Users' Association, met the committee at El Centro. Former Chief Engineer Weymouth accompanied the party.

Col. B. F. Fly, of Yuma, official guardian of the interests of the Yuma project and particularly of Yuma Mesa, is spending the winter in Washington, D. C., and is a frequent visitor at the Washington office.

Mrs. Sadie Maddux, clerk on the Carlsbad project, has resigned, effective October 31.

J. L. Savage, designing engineer of the Denver office, recently visited the Boise project and inspected a possible reservoir site on Upper Payette Lake. L. N. McClellan, engineer, also visited the Black Canyon Dam power plant, which was about complete and ready for a trial run.

George W. Lyle, bookkeeper at the Burley office, Minidoka project, since August 8, 1922, has been transferred to the King Hill project, effective October 25, to fill the vacancy caused by the resignation of E. V. Hillius, former chief clerk.

J. L. Savage, designing engineer, and B. W. Steel, engineer, from the Denver office, visited the American Falls work recently to confer with local officials as to the work on the dam and the details of the plans.

W. H. Olin, agriculturist of the Denver & Rio Grande Western Railroad, spent several days on the Grand Valley project and was shown certain areas in which he was particularly interested from a colonization standpoint. Mr. Olin expressed himself as quite hopeful that considerable progress can be made in the settlement of the project and Orchard Mesa within the next year.

Oro McDermith, consulting engineer of the Kittitas Irrigation District, is in Washington, D. C., in connection with matters relating to the proposed development of the Kittitas division of the Yakima project.

Oliver P. Morton, formerly district counsel of the bureau and special assistant to the Attorney General in charge of the Orland water right adjudication suit, has been retained by the Orland Water Users' Association in connection with pending developments in the case.

John S. Longwell, former superintendent of the Shoshone project and now resident engineer for the East Bay Utilities District, visited the Orland project recently. Mr. Longwell is in charge of the aqueduct division of the Mokelumne project for bringing in a water supply for the East Bay cities of the San Francisco Bay region.

Andrew Weiss, assistant director of reclamation economics, was in Madras, Oreg., recently in connection with investigations of the Deschutes project.

District Counsel Roddis was a recent visitor on the Shoshone project, principally in connection with obtaining data as to the fulfillment of agreements made by water users when they secured extensions of time on repayments under the act of May 9, 1924.

The appraisal and classification of lands on the Spanish Springs project, owned by the Central Pacific Railway Co., have been completed by Engineer A. W. Walker and D. G. Christen, field agent, Land Department, Southern Pacific Co. A total area of 11,490 acres was covered.

W. G. Swendsen, land commissioner of Idaho, visited the Klamath project recently. He is interested in securing data on the possibilities of new industries on the project.

E. U. Combs, agricultural superintendent of the Sacramento Sugar Co., recently inspected the irrigable lands of the Klamath project, especially, the Tule Lake area, with a view to determining their adaptability for raising sugar beets. Mr. Combs was impressed with the quality of the beets raised for experimental purposes and expressed himself as being confident that the Klamath district would develop into an important sugar-beet area.

WOMEN'S PLACE IN RECLAMATION GROWTH

Economists are unanimous in stressing the important place occupied by women in rural life. The value of their work in making homes out of mere dwelling places, in ameliorating the hardships incident to the transformation of the desert into a farm community, and, in general, in coordinating all those activities which tend to contentment under adverse conditions and the building up of the highest type of rural life, can not be overestimated. The reclamation projects offer exceptional opportunities for organized effort on the part of the women. On many of the projects the work they have done and are doing leaves little to be desired.

With a view to bringing the activities of the women on these projects to the attention of others where there is need for greater development, the NEW RECLAMATION ERA is planning to print from time to time special articles in the interest of project women. Miss Mae A. Schnurr, secretary to the commissioner, has been designated associate editor of the ERA to further this cause, and will be glad to receive suggestions from the project women individually or through their women's organizations.

In any event, you are urged to write evidencing your interest in adding this feature to your magazine. These letters will act as a stimulus and inspire and urge the writer to greater effort in bringing to the women on the farms reading matter we hope they will look forward to receiving.

FARMERS: INVENTORY AND APPRAISE ALL YOUR LIVESTOCK! I.

OUR sons and daughters in these days are viewing more and more critically the conditions of farm life and require, probably more than ever before, to be convinced, against the thoughtless evidence of their eyes, that real independence, a full measure of self-respect, and the best opportunity to develop family life, are still, and always must be, offered on the farm.

It becomes, therefore, our best interest to retain a grip upon their confidence and their sympathy in order to exert that influence for the family good which our affection, and experience should contribute.

Our boys are our best, our most precious livestock! Accordingly, their appraisal should be measured by their work, whether well-willed and susceptible to training, by the part they play in the family life, and the incentive they contribute to their sire to his improving and maintaining the farm free from debt and to so hand it down to their generation.

In how many cases do farmers fail in the often delicate matter of their relation to their sons because of failure to develop their value to the farm? Far too often, I think!

Every boy is born under some constellation. If under Boötes, the Plowman, then a farmer is in the making. But to realize his destiny youth must be on the lead rope, for teaching and training, lest undirected ambition or standards too high for individual health and strength come to discouragement, or lack of sympathy and attention permit the active thought of youth to wander elsewhere.

It is the natural inclination of healthy boys exercising freedom of choice to choose the best of their associates for their friends, read the best books, prefer good movies, and subscribe to a good newspaper. In casting up the account of profit and loss later in life choice will appear to have exerted a great influence, not only through education but in every channel of activity.

Results, then, arise from choice, and luck, so often credited with the influence to which it is not entitled, is only "being prepared to take advantage of opportunity."

In the old days the driving colt required a bit suitable to his temper and his mouth, and so must the bit of parental guidance be chosen to suit the individual boy.

If he shows reluctance to be led and a repugnance to farm life, the boy's fitness probably lies in another direction. If patient observation reveals such a fixed inclination to desert the farm, the father's expectation of a son on the farm must give way, and should give way gracefully, to another career.

Farmers who can use labor only part of the year are likely to be hardest pressed for help when they need it and to get only a poor class of labor.

Many farmers could, at reasonable expense, provide new or alter existing structures to afford more acceptable quarters for casual farm laborers.

APPLE GROWERS' PROSPECTS BRIGHT

The per capita consumption of apples in the United States is now about half an apple a day.

The total crop this year will amount to about 164,000,000 bushels, compared with 179,000,000 bushels last year. The present year's crop is of unusually fine quality, and less than the ordinary proportion of the crop will be wasted or used for manufacturing purposes. The commercial crop will reach 30,134,000 barrels compared with 28,587,000 barrels last year.

AGRICULTURAL PRICES AND COSTS

The accompanying chart, showing relative agricultural prices and costs from 1914 to 1924, inclusive, with 100 as the base in 1914, was prepared by the National Industrial Conference Board (Inc.), of New York City.

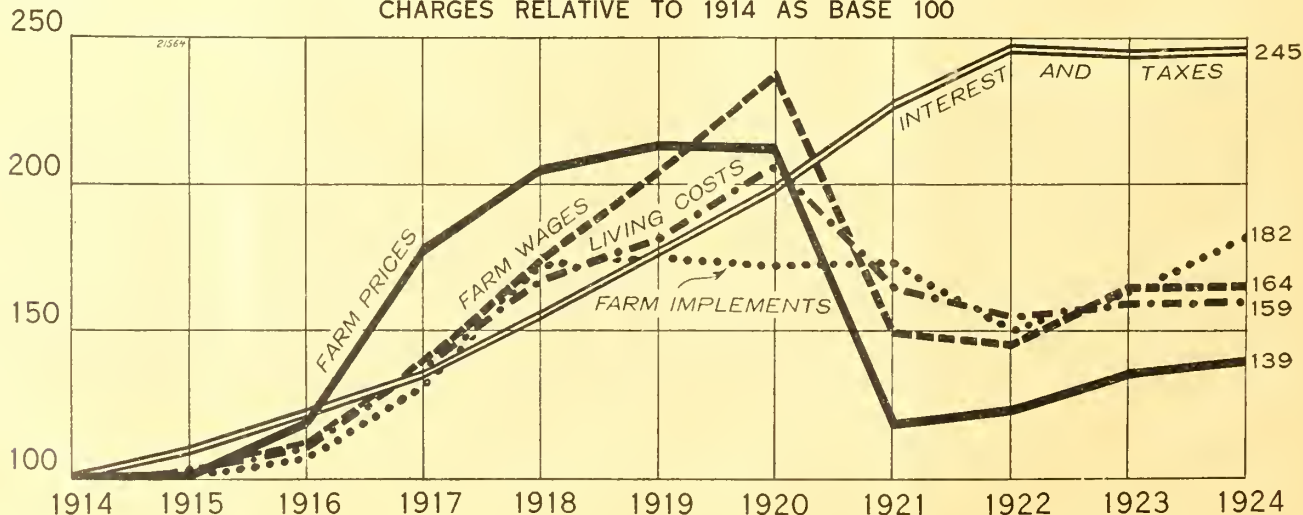
"Farm implements" represent dealers' prices in April for 10 standard farm implements. "Farm wages" is an index of wage rates per month, per day, with and without board, weighted according to the prevalence of each type of payment. "Living costs" represent the retail cost of living, omitting rent. "Farm prices" are prices paid to farmers for 30 representative farm products weighted in proportion to the relative amounts marketed in the period 1918-1923.

For flooding over the top of the ground, larger heads of water can be used than in the case of corrugation systems.

INDEX
NUMBERS

AGRICULTURAL PRICES AND COSTS

CHARGES RELATIVE TO 1914 AS BASE 100



INDEX

NEW RECLAMATION ERA, VOLUME XVI,

FOR THE YEAR 1925

Page numbers for separate issues

No.	Month	Page	No.	Month	Page
1.	January	1-16	7.	July	97-112
2.	February	17-32	8.	August	113-128
3.	March	33-48	9.	September	129-144
4.	April	49-64	10.	October	145-160
5.	May	65-80	11.	November	161-176
6.	June	81-96	12.	December	177-192

A

	Page
Accretions to reclamation fund and investment of United States, by States, June 30, 1925	159
Adjustment advisers come to Washington	28
Advance payment of operation and maintenance charges	126
Agricultural and economic needs of the projects	135
cooperation means mutual helpfulness, J. C. Gilbert	149
prices and costs	192
Alfalfa yield increased by livestock	160
Algeria, colonization of by French	112
American Falls Dam contract authorized	43
Apple growers' prospects bright	192
tree 26 years old on Yakima project grows record fruit	176
Appropriations for reclamation	55
Argentina, colonization in	190
Attorney General—Ruling on Baker project	170
Australia gets British settlers	80
Australia's Dawson Valley irrigation project	14

B

Baker project, ruling on by Attorney General	170
Belle Fourche project, August Maass, successful farmer	186
Blackhead control in turkeys on Newlands project	76
Board of survey and adjustments	33
W. A. Delzell appointed to serve on	93
Boards appointed to select settlers	175, 189
Boise project, dairy profits on	16
drainage and water rental charges	106
Boise Statesman—Wanted: Selected farmers	169
Booklet (project) will have full information	48
British colonists for Canadian land	9
settlers go to Australia	80
settlers go to Canada	45
Broadening the scope of Federal reclamation, Hubert Work	81
Bryan, Kirk, describes plan to curb land speculation	70
Building arrangements (proper) save time and labor	90

C

California, limit of irrigated area in	144
project to be investigated	16
Canada, British settlers go to	45
Canada's ex-soldiers assisted in farming	57

	Page
Canadian farmer, qualifications of a	79
land, British colonists for	9
Cattle fed on balanced ration	44
Chief clerk (new) for Washington office	44
Classification (land) on the projects	38
Clayton, W. B., Commercial power on the Minidoka project, 1924	57
Cline, L. E., describes methods to prevent blackhead in turkeys on Newlands project	76
Colorado River silt, is it a natural fertilizer?	189
ton-litter contest	111
ton-litter contest by H. A. Ireland, associate agriculturist, Montrose, Colo.	187
Columbia Basin special commission makes report	154
River water allocation	187
Commissioner and Secretary get first-hand data	129
calls settlement meeting	159
Elwood Mead. Future of irrigation development in Montana	115
and Secretary Work discuss reclamation, at Chico, Calif.	65
meets southern Governors	112
receives new honors	23
urges need of prompt payment	17
Completeness of effort	29
Cooperation	133
in land problems, Charles H. West	118
is a development from within, J. C. Gilbert	149
State, in reclamation work	65
Cooperative board, Milk River project	72
boards, local personnel of	60
marketing on Shoshone project	45
results in Denmark	47
Cotton growing on southwestern projects	7
Cramton, Congressman, urges need for cooperation	132
Credit corporations and loan associations	39
for the farmer, two Federal sources of	181
Crop and livestock census	174
conditions on the projects	77
shipments from Yakima break record	133
Crops and livestock products, marketing of	178
bumper, predicted	117
in Yakima Valley worth \$36,563,047	48
1924, show profits	126
Cucumbers pay C. M. Bagley, Sunnyside division, Yakima project	185

			Page		Page
D				H	
Dairy association, a cooperative.....			91	Hibbs, Newton, presents system for eliminating waste	
cow, livestock interests center in.....			62	water.....	69
profits from.....			175	Hog production on the projects.....	79
cows, are they paying?.....			73	Hungary, development of state settlements in.....	59
herd points.....			127	I	
Dairying profits on Boise project.....			16	Idaho seed growers win many prizes.....	47
Danish small-holdings acts help home ownership.....			156	Idle and unused land, development of.....	68
Dawson Valley irrigation project, Australia.....			14	Inspection division (department).....	43
Delzell, W. A., Salem, Oreg., appointee on board of				Interpretation of new legislation.....	34
survey and adjustments.....			93	Ireland, H. A., The Colorado ton-litter contest.....	111, 187
Denmark, cooperative results in.....			47	plans farms subsidy.....	174
small landholdings legislation in.....			42	Irrigated land settlement.....	123
Denver conference to have far-reaching effect.....			24	pasture fine for dairying.....	175
Dominican Republic colonization.....			111	Irrigation districts increase in number.....	80
Drainage and water rental charges, Boise project.....			106	hints from a practical irrigator.....	10
payment plan urged.....			131	in South Africa encounters difficulties.....	93
E				projects need better methods.....	123
Earth dams, small, design and construction of, W. H.				Irrigation rules, helpful.....	96
Nalder.....			120	will help per capita production.....	48
Economic phases of the Vale project, Oregon.....			66	Italy, land development policy in.....	112
basis must be sound, Commissioner Mead.....			167	Itinerary of board of survey and adjustments.....	61
Economic report on seven proposed projects.....			109	K	
Economic survey basis of land settlement.....			51	Kirksey, Frank W., death of.....	16
Economy in use of water, Victor Morgan.....			101	Kittitas project, Washington, economic aspect of.....	18
Egg production and prices merit consideration, Bureau of				Klamath County fair, 1925.....	176
Animal Industry.....			152	Klamath project, Gerber Dam construction.....	182
Electricity, use of, on Minidoka project.....			57	Lower Klamath Lake.....	172
Elephant Butte district to yield \$7,000,000 this year.....			143	Kreutzer, Geo. C., Cooperative marketing principles out-	
Embargo, Rio Grande, lifted by Secretary.....			105	lined.....	92
Employees of bureau during past 11 years.....			9	Sugar beets afford opportunity for profits.....	180
Engineer, definition of.....			30	Tentative plan to obtain settlers on projects.....	84
Engineering News-Record, editorial from on selection of				L	
settlers.....			168	Land classification on the projects.....	38
England, helping men own farms in.....			141	reports.....	61
Evaporation after irrigation.....			110	Legislation, official interpretation of new.....	50
F				Legal work of the Reclamation Bureau.....	167
Fact finders' act.....			54	Legislation, recent Federal irrigation.....	52
interpretation of.....			50	Livestock and crop census.....	174
official interpretation of certain subsections of.....			34	increase yield of alfalfa.....	160
Farm Communities Association.....			136	interests center in dairy cow.....	62
Federal sources of credit for the farmer.....			181	should be inventoried and appraised.....	192
Field organization changes.....			13	young, a factor towards increased income.....	127
Finance corporations in Milk River Valley.....			83	Loan associations, etc.....	39
Financial outlook good for farmers.....			113	Credit corporations.....	39
returns improved, farms show.....			127	Loans (adequate farm) for irrigated lands.....	39
Floods of 1925 on Rio Grande, Rio Grande project.....			173	Local cooperative boards, personnel of.....	60
Fly, Col. B. F., "Beloved Yuma Mesa".....			62	Lower Klamath Lake, Klamath project, Oregon.....	172
distributes fruit.....			2	Rio Grande delegation visits project.....	142
Foreign market, Yakima project fruit tops.....			144	Yellowstone project, improvement on.....	157
Free reclamation. Editorial from Reno Gazette.....			94	sugar-beet growing on.....	47
Future of irrigation development in Montana, Elwood				Mc	
Mead.....			115	McCulloch, Chas. N., new chief clerk.....	44
G				McKay Dam, Umatilla project, construction of.....	139
Gerber Dam construction, Klamath project.....			182		
Germany continues home colonization.....			123		
Gilbert, J. C., Problems of cooperative organization.....			149		
Goodwin, Francis M., appointed on board of survey and					
adjustments.....			64		
Governors of North and South Carolina, Commissioner					
Mead meets in conference.....			112		
Grandview, Washington, community day.....			124		

M

	Page
Maass, August, successful farmer, Belle Fourche project.....	186
Marketing of crops and livestock products.....	178
principles outlined, Geo. C. Kreutzer.....	92
Mead, Elwood, Development of Wyoming's irrigation resources.....	102
Problems of Federal reclamation.....	88
of Federal reclamation—address delivered at Chicago October 26, 1925.....	162
Sound economic basis necessary.....	167
Mesa grapefruit grove, cost of.....	157
Milk River project cooperative board.....	72
sugar factory.....	185
Valley, finance corporations in.....	83
Minidoka project, commercial power on the.....	57
turkey growing.....	22
seed potato production.....	44
Montana, The future of irrigation development in. Elwood Mead.....	115
Morgan, Victor, Save irrigation water and grow more crops.....	101

N

Nalder, W. H., Design and construction of small earth dams.....	120
Ness, Sam, successful water user. Greenfields division, Sun River project.....	151
New legislation, official interpretation of.....	34
New methods must be applied to new conditions. Secretary Work, speech at Great Falls, Mont., June 26, 1925.....	113
Newlands project, blackhead control in turkeys on.....	76
increases payments.....	99
North Platte project, Guernsey dam.....	30
Tunnel No. 3 constructed, J. K. Rohrer.....	108

O

O'Donnell, I. D., irrigation hints from a practical irrigator.....	10
Organization activities and project visitors.....	191
Orland delinquents are urged to pay up.....	112
project maintains record.....	17
Owyhee project claims presented.....	159
Oregon-Idaho, economic phases of.....	3

P

Palestine farming communities.....	15
Per capita production helped by irrigation.....	48
Personnel and project visitors, note on.....	158
matters, uniformity in.....	62
Pigs thrive best in spring.....	78
Pilot Butte power plant, Riverton project.....	58
Plans for future reclamation work.....	162
Poultry raising produces profits.....	160
Power, use of, on American farms.....	128
Problems of Federal reclamation, Elwood Mead.....	88
that must be met in future reclamation, Hubert Work.....	97
Profits shown on last year's crops.....	126
Project land classification.....	38
reappraisals, plans for.....	11
Projects, new and old.....	153
Proposed projects, report on.....	109
Public land sales show decrease.....	46

Pumps insure against drought.....	126
Punjab canal colonies.....	128

R

Railroad conference in Chicago.....	49
Radio used by farmers for market news.....	159
Railways, what is the value of a settler to.....	87
Reappraisals, plans for project.....	11
Reclamation act, need for general revision of.....	2
fund helped by sales.....	144
making a fresh start in.....	134
policy based on economic principles, David Weeks.....	100
policy, Secretary Work outlines future.....	1
Recreational units on projects.....	94
Regulations to govern selection of settlers.....	148
Relief of settlers must be safeguarded.....	28
Reno Gazette, Free reclamation.....	94
Reorganization of field offices.....	13
Repayment policy outlined.....	126
Review of the month.....	145, 161, 177
Rio Grande Commission, appointment of Doctor Mead on.....	23
embargo lifted by Secretary's order.....	105
floods of 1925.....	173
project, cooperation on.....	29
sand sluicing on.....	74
settlement on.....	119
Riverton project, Pilot Butte power plant.....	58
Rohrer, J. K., Tunnel No. 3 constructed on North Platte project.....	108

S

Sacramento Valley surveys continue.....	64
Sand sluicing on the Rio Grande project.....	74
Secretary and commissioner get first-hand data.....	129, 146
of the Interior, problems in future reclamation.....	97
Secretary of the Interior, speech at Great Falls, Mont., June 26, 1925.....	113
to make trips to projects.....	97
and Doctor Mead discuss reclamation, at Chico, Calif.....	65
leaves for West.....	61
decision not to be overturned.....	138
Seed potato production (Minidoka).....	44
Seger, B. J., credit corporations, etc.....	39
Selected farmers wanted, Boise Statesman.....	169
Selection of settlers on basis of industry, experience, etc., necessary if Government's investment is to be safeguarded. Editorial from Engineering News-Record.....	168
regulations to govern.....	148
Settlement and credit.....	188
and financial data on various projects, summary of.....	166
conference.....	186
an assured success.....	171
economic survey basis of land.....	51
plan indorsed.....	110
Shoshone project, cooperative marketing on.....	45
Silo helps the dairy herd.....	127
Sluicing, sand, on Rio Grande project.....	74
Smith, Addison T., lauds Idaho crops.....	174
South African irrigation encounters difficulties.....	93
repayment and settlement problems.....	31
Platte River compact.....	190
Southwest benefits from reclamation.....	117
Speculation in land, plan for curbing.....	70

	Page		Page
State cooperation in reclamation work.....	65, 96	Wages for labor more than double.....	160
settlement.....	49	Walter, R. F., now chief engineer.....	87
Strawberry production on the Yuma project.....	137	Washington office and general investigations, expense of.....	175
Valley project notes.....	125	Waste water, an irrigation system that eliminates.....	69
Successful farmer, viewpoint of.....	140	Water conservation and control meeting.....	187
Sugar-beet growers make plans for 1925.....	16	supply of the projects.....	125, 144, 153
growing on Lower Yellowstone.....	47	Weeks, David, Reclamation policy based on economic principles.....	100
beets afford opportunity for profits, Geo. C. Kreutzer.....	180	West, Charles H., land problems subject of cooperative arrangement.....	118
factory, Milk River project.....	185	Woman's page to be resumed in Era.....	191
Sun River project, Greenfields division, Sam Ness, successful water user.....	151	Work, Hubert, broadening the scope of Federal reclamation.....	81
T		Wyoming's irrigation resources, development of. Elwood Mead.....	102
Tablets, descriptive, suggested for dams.....	126	Y	
Tieton Dam, dedication.....	123	Yakima apples, box of, brings grower \$1.18.....	28
Town planning a rural need.....	122	crop shipments from, break record.....	133
Turkey growing on the Minidoka project.....	22	dairy cow sets real record.....	151
U		project apple tree 26 years old grows record fruit.....	176
Uncompahgre crops renew confidence.....	133	fruit tops foreign market.....	144
project produces fine crops.....	179	soil treatment proves effective.....	172
Unused and idle land, the development of.....	68	Sunnyside division. Cucumbers pay C. M. Bagley.....	185
V		wipes out deficit.....	41
Vale project, Oregon, economic phases of.....	66	Valley crops give good returns.....	176
Value of a settler to the railways.....	87	worth \$36,563,047.....	48
Vegetable garden needed on every farm.....	80	Yuma fire, offers of aid follow.....	46
Visit of Secretary and commissioner to projects.....	129, 146	mesa, Colonel Fly's beloved.....	62
Voorhies, Edwin C., Small landholdings legislation in Denmark.....	42	grape fruit grove.....	12
		project, Mesa division, grapefruit grove.....	157
		strawberry production on.....	137

